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ABSTRACT

The curriculum guide was developed to serve hearing impaired children at the Kendall Demonstration School elementary/middle school in Washington, D.C. The guide is based on learning objectives which are organized by school year as well as by content area. The instructional plan for each objective and subobjective includes teaching strategies, student activities, and suggested resources in a variety of educational media. The curriculum is organized around seven major concepts: space, time, change, adaptation, variety, interrelationships, and equilibrium. Knowledge objectives are divided into three major content categories (physical science, earth science, and life science) and 10 subcategories (e.g. energy, geology, sound and hearing). In addition, the curriculum develops the following eight skills: observing, communicating, experimenting, formulating and testing hypotheses, classifying, measuring, inferring, and predicting. Student progress is monitored using the curriculum record-keeping forms which include a level and textbook record, a yearly progress chart, and a cumulative progress chart. Among appendixes are a list of suppliers and resources, record-keeping forms, suggestions for teaching special topics, and safety guidelines. (DB)

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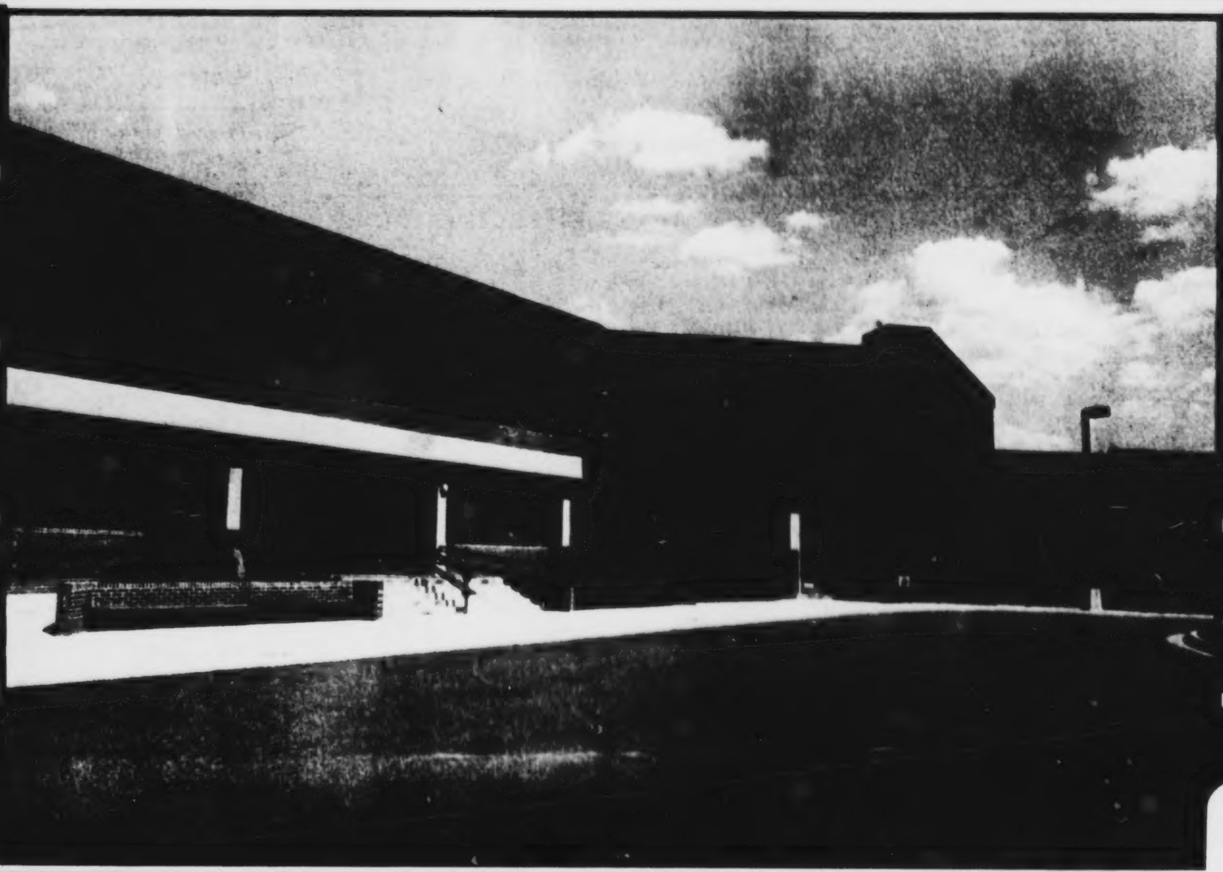

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Kendall Demonstration Elementary School

SCIENCE CURRICULUM GUIDE

Developed by Sara Gillespie
KDES Science Content Specialist
Pre-College Programs
Gallaudet University

"to give our children roots and wings"

Second Edition

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KENDALL DEMONSTRATION ELEMENTARY SCHOOL

SCIENCE CURRICULUM GUIDE

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* Each curriculum unit has an objective and subobjectives, and lists teaching strategies, classroom activities, and suggested resources.

KDES SCIENCE CURRICULUM GUIDE

PREFACE

During the 1980-81 school year, the Kendall Demonstration Elementary School (KDES) undertook the development of a curriculum guide series, a clear and accurate representation of the school's programs in Science, Language Arts, Mathematics, Social Studies, and Auditory Skills. Curriculum objectives, which had been several years in development, were arranged in a scope and sequence format. Each objective was supported by student activities, instructions for teachers, recommended resources, and in some cases, evaluation strategies.

As part of the initial development process, early drafts of the guides were used in KDES classrooms and evaluated by teachers. That evaluation provided data for revisions, and first editions of the guides were published and offered to other programs in 1982. Since that time, additional evaluation data have been collected from KDES teachers and students.

This second edition of the KDES Science Curriculum Guide incorporates many recommendations that resulted from that ongoing evaluation. The guide now includes a detailed teaching philosophy. The objectives are newly organized by levels as well as content areas, and for each objective, the guide recommends a series of teaching/learning activities.

Looking to the Future

In addition to the curriculum guides, KDES is currently involved in a major effort to design criterion-referenced tests to evaluate student achievement of curriculum objectives in each of the four core areas. Those items are being pilot tested in KDES classrooms, and will be field tested in other programs serving deaf students. At some point in the future, the criterion-referenced test items will be available from Outreach as a supplement to the curriculum guide series.

During the course of this development effort, KDES has also been implementing a computer-managed education system (CMES), designed to offer low-cost computer technology to schools and programs serving hearing impaired students. Both CMES hardware and software systems are available from KDES at reasonable cost, and can be adapted for any educational environment. For further information about computer-aided instruction, additional Pre-College curriculum materials, or opportunities for in-service training, please contact:

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KDES SCIENCE CURRICULUM GUIDE

FOREWORD

In their daily routine, teachers of science are guided by several important realities: their own experience and training, the needs and capabilities of their students, the curriculum requirements of the school and school district. Successful learning is often built around situations involving science that arise during the course of the school day. One thing is certain; students will live all their lives in a world pervaded by issues that require familiarity with science concepts and scientific skills.

A comprehensive elementary school science guide, then, must provide structure for teaching a variety of information in widely diverse areas of study. It must emphasize the importance of scientific skills, building students' confidence in their own ability to analyze and solve the problems they encounter. It must be practical and flexible enough for use in a cross section of educational settings. The KDES faculty members who have contributed to the development of this guide have good reason to believe that it meets those important criteria.

A first edition of the *KDES Science Curriculum Guide* was published in 1982. During the intervening years, teachers at the Kendall School and in other programs using the guide were encouraged to provide feedback on its practicality for classroom use. This second edition is completely revised and rewritten, incorporating additional features requested by those evaluators.

- The learning objectives on which the guide is based are organized by school year as well as by content area, making it easier for teachers to plan for students at all levels.

- The instructional plan for each objective and subobjective includes teaching strategies, student activities, and suggested resources in a variety of educational media.

This current edition of the KDES Science Curriculum Guide was developed by Sara Gillespie, KDES science content specialist. Gillespie has been a faculty member at the Kendall School since 1974.

Before her current appointment, she taught all classroom levels, from preschool through intermediate, primarily in science classes. She began work on the science guide nearly three years ago.

During its development, the guide was reviewed by a number of teachers and supervisors, including Rubye Frye, Angela Bednarczyk, Fred Mangrubang, and Sarah Raymond of KDES, and Joyce Doblemeier, a science teacher at the Model Secondary School for the Deaf (MSSD), also on the Gallaudet University campus. Mary Abrams, managing editor of Outreach Products, part of the Pre-College Center for Curriculum Development, Training, and Outreach, provided the final editing, formatting, and production of the guide.

Margaret Hallau, Ph.D., Director
Center for Curriculum Development, Training, and Outreach
Gallaudet Pre-College Programs

PHILOSOPHY OF THE SCIENCE CURRICULUM AT KDES

The Nature of Science

> "Science is an accumulated and systematized learning, in general usage restricted to natural phenomena. The progress of science is marked not only by an accumulation of fact, but by the emergence of scientific method and of the scientific attitude." *

This definition tells us that science is:

A body of knowledge--facts, principles, laws, and theories.
A set of processes or methods--observing, classifying, measuring, etc.
A set of attitudes--curiosity, skepticism, open-mindedness, objectivity, etc.

Science teaching must address all three areas. Teachers need to provide their students with more than scientific facts and principles; they must demonstrate the process of science --how to "do science." The science classroom should be a place in which students feel free to observe, to be curious, and to inquire. The joy of discovery must be kept alive for students of science at all ages. The program is based on certain basic assumptions about science teaching, explained in depth in the section titled "Essential Practices in Science," beginning on page 21.

Goals of the KDES Science Program

The major goal for students in the KDES Science Program is to beome scientifically literate. Students are encouraged to develop:

Skills for critical thinking and problem solving, including observation, classification, measurement, and experimentation.

Understanding of scientific principles, facts, and theories.

Scientific attitudes: open-mindedness, objectivity, skepticism, respect for logic, desire to know and understand, and willingness to question all things.

Appreciation and respect for the world and its creatures.

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* "Science," in The Columbia Encyclopedia, third edition. Washington, DC: National Science Teachers Association, 1963, page 1990.

CONCEPTUAL SCHEME FOR ORGANIZING THE OBJECTIVES

The KDES Science Curriculum Guide is organized around seven major concepts, defined by Gerald S. Craig, in Science for the Elementary School (1966).

SPACE - The universe is very large.

TIME - The earth is very old.

CHANGE - The universe is constantly changing.

ADAPTATION - Life is adapted to the environment.

VARIETY - There are great variations in the universe.

INTERRELATIONSHIPS - Living things are interdependent.

EQUILIBRIUM - Forces are in equilibrium.

On the next several pages are Conceptual Scheme charts, showing the science units for each department level.

Craig, Gerald S., Science for the Elementary School Teacher, fifth edition. Waltham, MA: Blaisdell Publishing Co., 1966, pages 92-100.

CONCEPTUAL SCHEME FOR THE SCIENCE CURRICULUM GUIDE

Primary Units	Intermediate Units	Middle School Units
SPACE - The universe is very large.		
Locating Objects in Space The Sky Measuring, Comparing Objects The Moon	Introduction to the Metric System Stars Reasons for Seasons Our Solar System Exploring Space	Review of the Metric System Models of the Earth The Earth-Moon System The Universe, Galaxies, and Stars Investigating Our Solar System Space Exploration
TIME - The earth is very old.		
Rocks and Soil Seasons Shadows and Light Day and Night Layers of Soil and Rock	Fossils Erosion and Weathering Conserving Energy Conservng Our Environment	Formation of Igneous and Metamorphic Rocks Formation of Sedimentary Rocks Investigating Erosion Water Systems Glaciers Age and Geologic History of the Earth Energy Resources and Their Use
CHANGE - The universe is constantly changing.		
Changes in Daily Weather Water in the Air Water on Earth	Changes in State of Matter Sudden Changes in the Land Oceans Air Affects Weather Forecasting the Weather	Chemical Reactions Earthquakes The Plate Tectonics Theory Landforms and Topographical Maps Renewable Natural Resources Nonrenewable Natural Resources The Atmosphere Weather and Climate Investigating The Ocean

Primary Units	Intermediate Units	Middle School Units
ADAPTATION - Life is adapted to the environment.		
Animals on Land, in Water, and in the Air Animal Homes Animals & Plants Move Animal Life Plant Life Animal Body Parts Parts of Plants Human Body Parts Male & Female Alike & Different Parts of Plants & Their Function Habitats	Life Cycles of Plants Life Cycles of Animals Adaptations Vertebrates Invertebrates Stages of Development Reproduction Being Hearing-Impaired The Ear The Eye and Vision Body Systems I Body Systems II	The Cell Animal Reproduction Plants—Structure & Function Plant Reproduction Organisms Change Over Time The Skeletal System Digestive System & Excretion Circulatory System Nervous & Endocrine Systems The Sense Organs The Reproductive System Pregnancy Heredity New Ways to Help the Hearing Impaired Deafness & Communication
VARIETY — There are great variations in the universe.		
Objects & Their Properties Describing Objects Grouping Objects Solids, Liquids, & Gases Living or Nonliving Things Plant or Animal Naming Plants Describing States of Matter	Kinds of Rocks Uses of Rocks, Minerals, & Other Natural Resources Grouping Plants Minerals Introduction to Protists Properties of Matter Introduction to Compounds	Investigating Matter The Periodic Table Compounds Metals Nonmetals The Carbon Family Organic Compounds Solutions Acids, Bases, & Salts Analyzing Minerals Investigating Organisms Methods of Science Kinds of Animals The Phylum Chordata Kinds of Plants Protists Fungi & Monerans

Primary Units	Intermediate Units	Middle School Units
INTERRELATIONSHIPS - Living things are interdependent.		
Things Animals Need	Communities of Living Things	Investigating Organisms
Things Plants Need	Four Basic Food Groups	Methods of Science
Food Chains and Food Webs	Essential Elements for Growth	Cells, Tissues, Organs, and Systems of Animals
Human Needs	Dangerous Situations	Nutrition
Good Health Practices	Basic First Aid	Diseases and Their Prevention
Good Safety Practices	Diseases and Their Treatment	Substance Abuse
Taking Medicine	Drugs	
Causes of Deafness	Cells to Systems	
Use and Care of the Hearing Aid	Uses of Plants	
Uses of Plants		
EQUILIBRIUM - Forces are in equilibrium.		
Doing Work	Exploring Light Energy	Investigating Wave Energy
Sources of Energy	Exploring Electric Energy	Investigating Lenses
Objects in Motion	Energy Transmission and Transformation	Investigting Sound Energy
Magnets	Friction	Investigating Heat Energy
Machines	Investigating Magnets	Investigating Energy Transfer
Simple Machines	Measuring Forces	Investigating Electricity
Sounds Around Us	Investigating Simple Machines	Investigating Magnetic Energy
Heat and Temperature	Properties of Sound	Investigating Nuclear Radiation
Exploring Heat and Energy	Measuring Hearing Loss	Machines Do Work
	Forms of Energy	Changes in Motion
		Newton's Laws
		Moving Water

HOW TO USE THE GUIDE FOR PROGRAM PLANNING

The science content of this guide is grouped into two sets of objectives—knowledge and skills. Knowledge objectives are divided into three major content categories and 10 subcategories, listed below. Each knowledge objective has a category code and a number. For example, G03 is a geology objective.

PHYSICAL SCIENCE
Properties of Matter (PM)
Energy (E)
Force, Work and Motion (FWM)

EARTH SCIENCE
Geology (G)
Climatology/Oceanography (C)
Astronomy (A)

LIFE SCIENCE
Plants and Animals (PA)
Human Growth & Reproduction (HGR)
Health, Safety, & Nutrition (HSN)
Sound and Hearing (S)

The Skills Objectives are listed separately; most of these skills are developed gradually, over time and at every level of study. The category code for the process skills is SK. There are eight major process skill areas:

Observing skills
Communicating skills
Experimenting skills
Skills for Formulating and Testing Hypotheses
Classifying skills
Measuring skills
Inferring skills
Predicting Skills

Organization of the Knowledge Objectives

The science curriculum guide identifies terminal objectives and subobjectives for students from age five to 15. The objectives are grouped into three departmental levels: Primary (ages 5 - 9), Intermediate (ages 9 - 12), and Middle School (ages 12 -15). The objectives are further grouped into nine, each providing about one year of classroom work, that are roughly equal to grade levels. grade levels. Each terminal objective has a unit topic and several subobjectives. Activities and materials are suggested for each objective, and others may be added from a variety of sources, including textbooks.

The Scope and Sequence charts, beginning on page 18, trace the learning objectives for each strand of knowledge. Learning in each category is designed to spiral from one level to the next. Thus it is necessary for students to complete all of the objectives suggested for each level before moving on to the next. At the beginning of the curriculum for each department, all the recommended objectives are listed first by topic, then in the suggested order of instruction.

Middle School courses are organized somewhat differently, with three separate courses of study suggested for the Middle School level.

First year — Life Science Course
Second year — Earth Science Course
Third year — Physical Science Course

At this level, it is recommended that teachers select a textbook that follows the suggested course sequence as closely as possible, to provide accurate current information and detailed descriptions of experiments to be performed in a lab setting.

Putting Together Specialized Courses

Teachers may sometimes want to combine groups of objectives into specialized courses, or break down the terminal objectives into smaller units to teach specific subject matter. For instance, the objectives for Health, Safety, and Nutrition (HSN) may be taught as a complete unit or course of study. The objectives for Sound and Hearing (S) can serve as the basis for a course on deafness—particularly valuable for deaf students in mainstream programs, and for their hearing classmates. Some of the objectives listed under Human Growth and Reproduction (HGR) might be combined to support a timely, flexible sex education course. Such specialized units may be taught as required, with or without use of standard textbooks.

Organization of the Skill Objectives

The Process Skills for science are developed within and across department levels. Science skills are rarely completely mastered. Students of science never stop improving their competence in observation, making predictions, or experimenting. Those and other skills are refined and improved with time and practice.

The skill objectives are not worked on separately, but as integral parts of each unit. In developing unit plans, teachers should choose activities and experiments that encourage students to build on their process skills. In order to balance scientific content and scientific method, students need opportunities to learn the "how" (process) of science as well as the "what" (facts and information).

Placement and Movement of Students

Students should initially be placed according to their ages and department levels. The teacher may use informal pre-tests to determine the concepts with which students are familiar. Formal tests, such as the SAT Science subtest, may also be used to assess students' backgrounds. Then each student should be placed on the most appropriate level within the department. It is not unusual for some students to be working above or below grade level.

Because science objectives spiral from one level to the next, it is important for students to complete all of the objectives within each level satisfactorily before moving on to the next. Some students may not advance a full level each year, but they will need to finish at at least 10 objectives per year in order to complete Level Six by the end of their time in Middle School. Students who work more slowly are asked to complete specific units at Level 6, selected from the Middle School curriculum.

Three options are suggested for students working in Science at Level 6, depending on their individual needs:

1. Students working at grade level should take Level 6 objectives as they appear on page 106, omitting those selected from the Middle School curriculum, indicated by asterisks (*).

2. Students working below grade level, who are in their final year of school, should work on the starred objectives for Level 6, along with other selected units.

3. Students who are entering Middle School after completing only Level 5 (one year below grade level), may skip Level 6 and go directly into the Middle School curriculum at Level 7.

Record Keeping in Science

Student progress in Science may be monitored with KDES record-keeping forms. (See Samples in Appendix G; they may be copied as needed for school use.)

1. Level and Textbook Record: Records are kept for each student, indicating the textbooks used, the curriculum level, and the science teacher for every school year.

2. Yearly Progress Chart: This chart is used to record the knowledge and skills objectives mastered or partially mastered by each student.

3. Cumulative Progress Chart: This is a cumulative record of each student's progress. Information from the Yearly Progress Charts are transferred to this chart each year.

Adapting the KDES Science Curriculum Guide for Different Texts or Programs

The arrangement of levels and units within levels of the KDES Science Curriculum Guide is based on two Charles E. Merrill science series: Accent on Science, K-6 and Focus on Science, grades 7 - 9. The topics may, of course, be rearranged for use with materials from other textbook publishers. In these instances, it will also be necessary to revise the record-keeping charts to reflect the appropriate arrangement of units.

Field trips can greatly enhance students' interest in science, and help make science concepts more concrete and meaningful. Many of the field trips suggested in this guide specifically cite resources in the Washington, DC, metropolitan area. Similar facilities may be found within traveling distance of most school districts.

Recommended Time Allotment for Teaching Science

The National Science Teachers Association recommends that students at the elementary school level receive at least 150 minutes per week of science instruction. At the Middle School level, students should have at least 225 minutes of science instruction per week.

ESSENTIAL PRACTICES IN SCIENCE

Teaching science is more than just teaching scientific facts and principles. It means teaching students how to observe. It means teaching methods and processes for thinking and discovering new concepts. A teacher who is familiar and comfortable with the traditions of science can provide students with the exciting experience of discovering their world.

A number of essential practices are recognized as components of any good education program:

- Providing a classroom environment that encourages students to take risks.
- Developing skills for critical thinking, problem solving, and decision making within all subjects.
- Incorporating reading, writing, and through-the-air language skills into all subject areas.
- Integrating teaching objectives into cohesive units of instruction that may incorporate a range of subject areas.
- Developing evaluation tools and record-keeping procedures to monitor student progress.

Science teachers are encouraged to apply all of these essential practices in the classroom.

A. Risk Taking in Science Involves:

1. Providing "hands-on" experiences.

Teachers need to create an environment in the science classroom that encourages students to take chances. One way to do this is to provide "hands-on" experiences for students. Scientists do more than read and think about science; they manipulate objects and materials in an effort to understand the world. They collect, observe, classify, put together, take apart, and change substances. Students at all levels need "hands-on" experience with objects in the classroom. The science room should be filled with a variety of objects to explore and manipulate. Most such objects can be collected or purchased inexpensively. Appendix C includes a list of basic materials for science instruction.

2. Using the Discovery/Inquiry Approach to Teaching.

Discovery/inquiry methods continue to be emphasized in most science programs. Researchers find that this method of teaching science can improve students' critical thinking skills, increase memory and retention, provide student-centered instruction that enhances student self-concept, offer opportunities to develop other abilities such as drawing, planning, organizing, and creating. It also allows students time to assimilate and accommodate new information.

In discovery activities, students use their mental processes to discover concepts or principles. They observe, classify, measure, predict, describe, and infer. Inquiry activities help maturing students behave more like adults. Their behavior is more systematic. They originate problems, formulate hypotheses, design and carry out experiments, and arrive at logical conclusions. There are several ways for teachers to structure discovery/inquiry approaches to science.

Guided discovery/inquiry: The teacher provides considerable structure. Students are asked to perform investigations in a step-by-step manner. The teacher originates the problem, describes how information is to be recorded, and leads the students to a conclusion.

Modified discovery/inquiry: The teacher presents the problem, and provides the materials and the setting to deal with it. Students are asked to observe, explore, and conduct tests to resolve the problem. The teacher serves as a resource, giving help only to prevent students becoming too frustrated.

Free discovery/inquiry: Students who have learned how to attack scientific problems may be ready for this approach. Students identify the problem to be studied and devise ways of solving it. The free discovery/inquiry approach is often used in preparing science fair projects.

All three of these methods are useful in teaching science. Teachers may want to start by using the more structured approach to discovery/inquiry until students become more comfortable with "doing science." Certainly, students at the Middle School level should have frequent opportunities for free inquiry.

B. Developing Critical Thinking Skills in Science:

1. Teaching the scientific process. Science is a process, and the skills students need to develop in order to "do science" are called process skills.

   Observing: Students must use all of their five senses when dealing with objects or organisms. The information students observe in the environment is then somehow communicated to other classmates. The teacher provides time for students to observe and describe objects or organisms.

   Classifying: Students generate categories and place objects, pictures, or vocabulary in the categories. At higher levels, the students should generate more than one category for any given group of objects. The teacher may provide objects, pictures, etc., for students to classify and asks students to explain the categories they choose.

   Communicating (Recording): Each process skill requires through-the-air communication of ideas. The communication process, however, calls for a written record of observations, classifications, or other processes. Students should write information according to specified formats; for instance, in tables, charts, or graphs. The teacher makes sure that observations are recorded in a manner that best communicates the facts. Samples of various formats are included in Appendix D.

   Measuring: Teachers should provide a wide variety of common measuring tools and demonstrate their use. In order to measure accurately, students must be able to choose appropriate measuring tools, use them properly, and carry out calculations with the results. At early levels, students should not be asked to measure precisely with standard measuring tools. Standards of accuracy should be applied only at higher levels.

   Experimenting: Students presented with a problem try to find a solution or explanation through experimentation. Developing an experiment involves accurate observation, communication, and recording of data. It might also include accurate prediction of outcomes. The teacher guides students in the investigation, often providing a problem to focus on and needed materials, then helping students analyze the results.

Predicting: When presented with an experiment, students should be able to make reasonable predictions about its result. This skill is refined as students complete more experiments. Prediction can also include estimation of measurements. The teacher makes sure that all students have opportunities to make predictions and estimates.

Formulating and Testing Hypotheses: A hypothesis is a general statement that explains an event, including observed and unobserved phenomena. The hypothesis is then used as the basis for further experimentation. Students must discuss an event, make a statement of fact about the event, then develop appropriate experiments to test the statement, proving or disproving it. The teacher helps students develop and test their hypotheses.

Inferring: Students observe facts and try to explain what they mean. The teacher must actively involve students in making inferences by asking appropriate questions.

2. Using appropriate questioning techniques. Some questions allow for a variety of answers, while others restrict students' responses.

Convergent questions limit the possible responses (What color is the grass?). Divergent questions may elicit a number of possible answers and allow a greater range for critical thinking (What do you think will happen next?). Divergent questions should be emphasized in the teaching of science.

Science teachers should avoid asking anthropomorphic questions that imply that natural phenomena have human characteristics:

- How does a worm feel when it is cut in half?
- How does a butterfly feel when he comes out of his cocoon?
- Why does the groundhog look for his shadow?

Teleological questions, which assume that natural phenomena have particular ends in mind should also be avoided:

- Why do plants want to grow toward the light?
- Why does lightning try to hit the tallest object?
- Why do salmon want to get back to their places of birth?

Questions in the science classroom should relate to the process skills needed for the lesson or activity. The following are examples of appropriate types of questions, classified by process skills:

Observing:	What can you observe about this animal?
Classifying:	How would you group these rocks?
Communicating:	How would you graph this data?
Measuring:	What would you use to measure the force?
Experimenting:	How would you determine the effects of acid rain on these plants?
Predicting:	What do you think will happen next, based on your observations?
Formulating and Testing Hypotheses:	What do you think would happen if the fruit flies were exposed to heat?
Inferring:	What conclusions can you draw from the data?

C. Enhancing Reading and Writing Skills Through Science.

Science is a natural vehicle for increasing student competence in reading and writing. Students need experiences before they can be expected to read or write about particular concepts.

A "hands-on," activity-oriented science program provides the kinds of experiences children need to foster the development of language and reading skills. Science provides rich opportunities for students to describe what they have seen or what they are doing. Creative writing skills are enhanced by scientific activity. In a report funded by the National Institute of Education,* Ruth Wellman found that:

- Activity-based science experiences help in the development of language and logic.
- Reading readiness in young children is accelerated by selected science activities.
- Science activities stimulate children to put their experiences into language.

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* Wellman, Ruth T., "Science: A Basic Tool for Language and Reading Development," in What Research Says to the Science Teacher, Vol. 1, Mary Budd Row, ed. Washington, DC: National Science Teachers Association, 1978, page 3.

- Science activities provide repeated encounters with objects and events, helping to develop improved concept formation and communication skills.

- Science instruction improves reading of students in grades 4, 5, and 6.

Other evidence cited by the National Science Teachers Association confirms that experimental science can be used as a means of improving reading readiness and oral language skills.*

D. Unit Planning in Science

Each terminal objective in this curriculum guide can be considered a unit topic. It is hoped that teachers using this guide will develop unit plans around these topics. Subobjectives for each unit are listed in the guide.

Teaching science concepts in units makes it possible to:

- Organize learning experiences around a unifying theme.

- Provide interdisciplinary units that combine science study with math, social studies, reading, and other subjects.

- Gather needed classroom materials ahead of time.

- Plan for a variety of activities.

- Group students for a variety of reasons.

- Allow time for thorough investigations.

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* Mechling, Kenneth R., & Oliver, Donna L., Science Teaches Basic Skills, Handbook I. Washington, DC: National Science Teachers Association, 1983, pages 46-57.

E. Evaluation in Science

- Informal testing: Teachers may develop informal tests on concepts and skills covered by one lesson or a group of lessons. Special science projects may be substituted for written tests.

- Formal testing: Criterion-references tests should be used to measure student progress on key units and objectives. Unit tests may be developed to cover concepts taught in specific lessons. Textbook publishers usually provide tests to accompany the units in their textbook series.

KDES SCIENCE CURRICULUM GUIDE

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

The Scope and Sequence of Objectives demonstrates how students can build familiarity with scientific subjects as they progress through the grade levels. Objectives are listed by content area and by the departments in which they should be taught.

PHYSICAL SCIENCE: Properties of Matter (PM)

Level	Objectives	
Primary	PM01	Compare and classify solid objects according to property: size, color, weight, shape, density, smell, taste, texture.
	PM02	Describe objects according to their properties.
	PM03	Classify objects according to their multiple characteristics.
	PM04	Measure and compare objects and events using non-standard and standard units.
	PM05	Observe and identify different states of matter.
	PM06	Identify characteristics of states of matter.
Intermediate	PM07	Measure relative properties of matter using the metric system.
	PM08	Describe and classify physical, chemical changes in states of matter.
	PM09	Identify the properties and structure of matter.
	PM10	Identify and classify different types of compounds.

PHYSICAL SCIENCE: Properties of Matter (PM, continued)

Middle School	PM11	Review the metric system.
	PM12	Investigate the characteristics of matter and some of its properties.
	PM13	Recognize a periodic table of the elements and use information from the table.
	PM14	Describe compounds and explain how they are formed.
	PM15	Identify the characteristics of metals and the uses of some important metals.
	PM16	Identify properties of non-metals and explain how each is used.
	PM17	Identify the properties of the carbon family members.
	PM18	Investigate the properties and uses of organic compounds.
	PM19	Describe how solutions are formed and how they are used.
	PM20	Investigate different types of chemical reactions.
	PM21	Identify properties of common acids, bases, and salts.
	PM22	Explore careers in the field of chemistry and related areas.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

PHYSICAL SCIENCE: Energy (E)

Level	Objectives	
Primary	E01	Identify forms of energy, their sources, and their uses.
	E02	Identify sources of heat and ways to measure it.
	E03	Identify the characteristics of heat energy.
Intermediate	E04	Identify the characteristics of light energy.
	*E05	Identify the properties of sound energy.
	E06	Identify the characteristics of electric energy.
	E07	Identify two general types of energy and the forms they can take.
	E08	Identify the transmission and transformation of energy from one form to another.
	E09	Identify energy resources and the need for conservation.

PHYSICAL SCIENCE: Energy (E, continued)

Middle School	E10	Investigate waves, their motion and properties, and the electromagnetic spectrum.
	E11	Identify the properties of visible light.
	E12	Investigate the use of lenses.
	E13	Investigate the properties of sound.*
	E14	Investigate heat energy.
	E15	Investigate heat transfer and its uses.
	E16	Investigate electricity and electron transfer.
	E17	Investigate magnetic energy.
	E18	Identify the properties of nuclear radiation.
	E19	Identify energy alternatives.
	E20	Explore careers in the field of energy.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

PHYSICAL SCIENCE: Force/Work/Motion (F)

Level	Objectives	
Primary	F01	Identify kinds of magnets and the objects they attract.
	F02	Describe work in terms of pushes and pulls.
	F03	Identify characteristics of objects in motion and at rest.
	F04	Identify and describe three simple machines.
	F05	Identify some common machines and their uses in daily living.
Intermediate	F06	Investigate magnets and their uses.
	F07	Investigate the direction and strength of forces.
	F08	Describe the effects of friction on motion.
	F09	Measure forces and their effects.
	F10	Investigate simple machines and the work they perform.
Middle School	F11	Investigate how machines can change forces to do work.
	F12	Investigate changes in motion resulting from the action of forces.
	F13	Investigate Newton's Laws.
	F14	Explore careers in the field of physics.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

EARTH SCIENCE: Geology (G)

Level	Objectives	
Primary	G01	Describe some characteristics of rocks and soil.
	G02	Identify layers of soil and investigate rock formed of layers.
	G03	Identify rocks and minerals by their characteristics and formation.
Intermediate	G04	Identify some physical properties of minerals.
	G05	Identify the uses of and means of processing rocks, minerals, gems, and other natural resources.
	G06	Identify fossils and explain how they are formed.
	G07	Identify and describe sudden changes in geographical features of the land.
	G08	Describe changes in land over time.

PHYSICAL SCIENCE: Geology (G, continued)

Middle School	G09	Identify and analyze the properties of minerals.
	G10	Investigate the forces that control the formation and properties of igneous and metamorphic rocks.
	G11	Describe the formation and composition of sedimentary rocks.
	G12	Investigate the agents of erosion.
	G13	Describe how river systems are formed; explain the importance of the groundwater system.
	G14	Describe the work of glaciers in erosion.
	G15	Describe the forces that cause earthquakes and ways to predict and measure them.
	G16	Investigate the internal forces that change the surface of the earth.
	G17	Identify and describe different landforms and the use of topographic maps to describe them.
	G18	Investigate the age and history of the Earth.
	G19	Identify renewable natural resources and how people use them.
	G20	Identify nonrenewable natural resources and how people use them.
	G21	Describe our energy resources and their use.
	G22	Explore careers in the field of geology.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

EARTH SCIENCE: Climatology and Oceanography (C)

Level	Objectives	
Primary	C01	Observe, name, and record daily changes in weather.
	C02	Identify and describe distince features of the four seasons.
	C03	Investigate water in the air.
	C04	Identify and describe the sources of freshwater on Earth.
Intermediate	C05	Describe ocean features and resources.
	C06	Describe how air affects the weather.
	C07	Describe how people can predict weather.
Middle School	C08	Identify the composition and structure of the Earth's atmosphere.
	C09	Investigate weather and climate.
	C10	Investigate the ocean.
	C11	Investigate the movement of water within the ocean.
	C12	Explore careers in the fields of climatology and oceanography.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

EARTH SCIENCE: Astronomy (A)

Level	Objectives	
Primary	A01	Describe the positions of objects relative to a specific reference point.
	A02	Identify and describe objects in the sky.
	A03	Investigate shadows and light.
	A04	Describe day and night in terms of the Earth's movement.
	A05	Describe the characteristics and motion of the moon.
Intermediate	A06	Identify and describe the planets in our solar system.
	A07	Describe the seasons in terms of the Earth's movement around the sun.
	A08	Describe the characteristics and motions of the stars.
	A09	Explore new discoveries and theories about space.
Middle School	A10	Investigate models to explain the Earth.
	A11	Investigate the Earth/moon system.
	A12	Investigate the universe, galaxies, and stars.
	A13	Investigate the motion and bodies of the solar system.
	A14	Investigate space exploration.
	A15	Explore careers in the field of astronomy.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

LIFE SCIENCE: Plants and Animals (PA)

Level	Objectives	
Primary	PA01	Identify objects as living and nonliving; state characteristics of each.
	PA02	Identify and describe the ways animals and plants move.
	PA03	Identify the needs of animals for healthy growth and development.
	PA04	Identify uses of animals.
	PA05	Observe and identify a variety of animals living in different habitats.
	PA06	Identify animal homes and describe where and how they are constructed.
	PA07	Observe and identify a variety of plants and tell where they grow.
	PA08	Identify the needs of plants for healthy growth and development; describe what happens when these needs are not met.
	PA09	Identify some parts of plants.
	PA10	Describe the life cycles of familiar animals.
	PA11	Identify body parts of animals and describe their functions.
	PA12	Describe the life cycles of familiar plants.
	PA13	Identify parts of plants and describe their functions.
	PA14	Identify and describe food chains, food webs, and the decomposition process.
	PA15	Investigate the factors or variables in several environments that are suited to the special needs of particular organisms.

LIFE SCIENCE: Plants and Animals (PA, continued)

Intermediate	PA16	Investigate the life cycles of animals.
	PA17	Investigate and describe adaptations of plants and animals.
	PA18	Investigate the life cycles of plants.
	PA19	Identify uses of plants.
	PA20	Investigate vertebrate animals.
	PA21	Investigate invertebrate animals.
	PA22	Investigate how plants are grouped.
	PA23	Identify some protists and explain why they are important.
	PA24	Identify and describe some ecosystems.
	PA25	Identify, describe, and compare communities of living things.
	PA26	Identify factors that are helpful and harmful to the environment.

LIFE SCIENCE: Plants and Animals (PA, continued)

Middle School	PA27	Identify characteristics and activities of living organisms.
	PA28	Describe how scientists use classification, measurement, and scientific method to solve problems.
	PA29	Identify the basic parts of a cell and describe the activities of a cell. Explain how microscopes are used to study cells.
	PA30	Identify the characteristics of different kinds of animals. Explain how scientists classify animals.
	PA31	Identify, describe characteristics of animals classified in phylum Chordata.
	PA32	Describe how cells, tissues, organs, and systems work to keep animals alive.
	PA33	Investigate how animals reproduce and the importance of reproduction to the survival of a species.
	PA34	Identify the characteristics of different kinds of plants; tell how plants are classified.
	PA35	Identify structures of plants and their functions.
	PA36	Investigate plant reproduction and the reproductive structures in seed plants.
	PA37	Identify the characteristics of organisms in each phylum of the protist kingdom.
	PA38	Identify the characteristics of various kinds of fungi and monerans.
	PA39	Investigate how organisms have changed through time.
	PA40	Explore careers in the fields of biology and zoology.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

LIFE SCIENCE: Human Growth and Reproduction (HGR)

Level	Objectives	
Primary	HGR01	Identify and describe what humans need for growth and development.
	HGR02	Identify human body structures and describe their functions.
	HGR03	Identify and compare male and female external characteristics.
Intermediate	HGR04	Identify cells, tissues, organs, and systems.
	HGR05	Identify the organ of sight and describe how people see.
	HGR06	Identify and describe the four basic body systems that give support, protection, and movement, and that coordinate all body functions.
	HGR07	Identify and describe the three basic body systems that supply food, oxygen, and water to the cells of your body.
	HGR08	Identify and describe the four stages of human development: infant, child, teenager, and adult.
	HGR09	Investigate the male and female reproductive systems.

LIFE SCIENCE: Human Growth and Reproduction (HGR, continued)

Middle School	HGR10	Identify parts of the human skeletal system and their functions.
	HGR11	Identify parts of the human respiratory system and their functions.
	HGR12	Identify organs involved in digestion and excretion and their functions.
	HGR13	Identify organs involved in circulation and their functions.
	HGR14	Investigate how the body is controlled and regulated by the nervous system and the endocrine system.
	HGR15	Investigate the sense organs.
	HGR16	Investigate the human reproductive system.
	HGR17	Describe pregnancy and the prenatal stages of development.
	HGR18	Investigate the principles of heredity.
	HGR19	Explore careers in the field of medicine.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

LIFE SCIENCE: Health, Safety, and Nutrition (HSN)

Level	Objectives	
Primary	HSN01	Identify and describe good health practices.
	HSN02	Identify and describe good safety practices.
	HSN03	Identify reasons and procedures for taking medicines.
Intermediate	HSN04	Identify foods in the four basic food groups and the needs they satisfy.
	HSN05	Identify how foods and their elements help the body grow.
	HSN06	Describe dangerous situations and explain what to do in each situation.
	HSN07	Describe basic first aid procedures for a vareity of emergencies.
	HSN08	Identify drugs, their uses and effects.
	HSN09	Identify common diseases and their treatment.
Middle School	HSN10	Explain how the nutrients in food are used by the body.
	HSN11	Identify the causes and prevention of disease.
	HSN12	Investigate substance abuse.
	HSN13	Explore careers in health, safety, and nutrition.

SCOPE AND SEQUENCE FOR KNOWLEDGE OBJECTIVES

LIFE SCIENCE: Sound and Hearing (S)

Level	Objectives	
Primary	S01	Identify various sounds in the environment and how they are produced.
	S02	Identify causes of deafness.
	S03	Explain the use and care of a hearing aid.
Intermediate	S04	Identify the properties of sound. *
	S05	Identify parts of the ear and their functions.
	S06	Identify methods of measuring hearing loss.
	S07	Discuss what it means to be hearing impaired.
Middle School	S08	Investigate the properties of sound. *
	S09	Discuss similarities and differences among hearing impaired people.
	S10	Discuss scientific advances in the area of deafness.
	S11	Explore careers in education of deaf students and other related areas.

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KDES SCIENCE CURRICULUM GUIDE

SCOPE AND SEQUENCE FOR SCIENCE SKILL OBJECTIVES

As with knowledge objectives, students are given repeated opportunities to use, build, and refine their skills in science. These scope and sequence charts trace applications of important skills at progressive levels of classroom work.

OBSERVING SKILLS

Level	#	Objectives
Primary	SK01	Observe objects using the five senses.
Primary/Intermediate	SK02	Identify physical characteristics of objects by direct observation.
Primary/Intermediate Middle School	SK03	Use instruments to observe objects.
Intermediate/Middle School	SK04	Observe repeatedly to accumulate data.
	SK05	Observe a series of events over a period of time and order them chronologically.
	SK06	Recognize cause and effect relationships after observing related events.

CLASSIFYING SKILLS

Level	#	Objectives
Primary	SK07	Group objects according to similarities and differences.
	SK08	Group objects based on a single characteristic.
Primary/Intermediate	SK09	Group objects based on two or more characteristics.
Intermediate/Middle School	SK10	Organize data into predetermined categories.
	SK11	Classify data by its relevance to a particular investigation.
Middle School	SK12	Use formal classification systems to identify a plant, animal, rock or other object.

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COMMUNICATION SKILLS

Level	#	Objectives
Primary	SK13	Describe an observation through the air, verbally, or pictorially.
	SK14	Describe an object verbally or through the air so that others can recognize it.
Primary/Intermediate Middle School	SK15	Describe an observation in writing.
	SK16	Construct graphs to represent collected data.
Intermediate/Middle School	SK17	Describe variables that may influence an observation.
Primary/Intermediate Middle School	SK18	Record events in sequence.
Intermediate/Middle School	SK19	Record observations according to a system for a specific problem.
Primary/Intermediate/ Middle School	SK20	Gather data on a particular topic, and report on it.

MEASURING SKILLS

Level	#	Objectives
Primary	SK21	Order concrete objects by weight, length, height, hue, texture, taste, etc.
	SK22	Use nonstandard units of measurement.
Intermediate/Middle School	SK23	Use standard units of metric measurement.
Primary/Intermediate Middle School	SK24	Demonstrate how to estimate a particular property.
Intermediate/Middle School	SK25	Use formulas for measuring.
Primary/Intermediate Middle School	SK26	Use tools to make precise measurements. (See list in Student Record section.)

INFERRING SKILLS

Level	#	Objectives
Primary/Intermediate/ Middle School	SK27	Make inferences about everyday experiences.
Intermediate/Middle School	SK28	State several possible inferences from a group of related observations.
	SK29	Make additional observations to test an inference.
	SK30	Change inferences when subsequent observations do not support the original inference.

PREDICTING SKILLS

Level	#	Objectives
Primary/Intermediate Middle School	SK31	Make predictions based on everyday observations and occurences.
Intermediate/Middle School	SK32	Differentiate between guessing (little or no evidence) and predicting (based on evidence from observation).
Primary/Intermediate Middle School	SK33	Make predictions based on recorded data.
Intermediate/Middle School	SK34	Use data from graphs to make predictions.
	SK35	Use quantitiative measurements to make predictions more accurate.

EXPERIMENTING SKILLS

Level	#	Objectives
Primary/Intermediate	SK36	Perform simple short-term activities to answer questions.
	SK37	Conduct simple experiments and record pertinent observations.
Intermediate/Middle School	SK38	Identify constants and variables in an experiment.
	SK39	Make observations and analyze data to arrive at a conclusion.
	SK40	Conduct controlled experiments to test a hypothesis or to answer questions.
Middle School	SK41	Design experiments with controls and variables to test questions.

SKILLS FOR FORMULATING AND TESTING HYPOTHESES

Level	#	Objectives
Intermediate/Middle School	SK42	Develop questions concerning observations, inferences, and predictions.
	SK43	Develop a hypothesis to explain an event.
	SK44	Test the hypothesis through experimentation.
	SK45	State whether the hypothesis is proved or disproved.

PRIMARY UNIT TOPICS—BY SUBJECT AREA

PHYSICAL SCIENCE

Properties of Matter (PM)

Objects and Their Properties
Describing Objects
Grouping Objects
Measuring, Comparing Objects
Solids, Liquids, & Gases
Describing States of Matter

Energy

Sources of Energy
Heat and Temperature
Exploring Heat Energy

Force, Work, & Motion (FWM)

Magnets
Doing Work
Objects in Motion
Simple Machines
Machines

EARTH SCIENCE

Geology (G)

Rocks and Soil
Layers of Soil and Rock
Kinds of Rocks

Climatology & Oceanography

Changes in Daily Weather
Seasons
Water in the Air
Water on Earth

Astronomy (A)

Locating Objects in Space
The Sky
Shadows and Light
Day and Night
The Moon

LIFE SCIENCE

Plants and Animals (PA)

Living and Nonliving Things
Animals and Plants Move
Things Animals Need
Uses of Animals
Animals on Land, Air, Water
Animal Homes
Naming Plants
Things Plants Need
Parts of Plants
Animal Life
Animal Body Parts
Plant Life
Parts of Plants and Their Functions
Food Chains, Food Webs
Habitats

Human Growth & Reproduction (HGR)

Human Needs
Body Parts
Male and Female

Health, Safety, Nutrition (HSN)

Good Health Practices
Good Safety Practices
Taking Medicine

Sound & Hearing (S)

Sounds Around Us
Causes of Deafness
Use & Care of Hearing Aids

PRIMARY OBJECTIVES—SUGGESTED SEQUENCE

First Year		Second Year		Third Year	
PM01	Objects & Their Properties	PA10	Animal Life	PA12	Plant Life
PM02	Describing Objects	PA11	Animal Body Parts	PA13	Parts of Plants and Their Functions
A01	Locating Objects in Space	S01	Sounds Around Us		
		S02	Causes of Deafness	F02	Doing Work
PM03	Grouping Objects	S03	Use & Care of Hearing Aids	F03	Objects in Motion
				F04	Simple Machines
PA01	Living & Nonliving Things	PM04	Measuring & Comparing Objects	F05	Machines
PA02	Animals & Plants Move				
PA03	Things Animals Need			PM05	Solids, Liquids, Gases
PA04	Uses of Animals	HGR01	Human Needs	PM06	Describing States of Matter
		HGR02	Human Body Parts		
G01	Rocks & Soil			E03	Exploring Heat Energy
		HSN01	Good Health Practices		
PA05	Animals on Land, Air, Water	HSN02	Good Safety Practices	C03	Water in the Air
PA06	Animal Homes	HSN03	Taking Medicine	C04	Water on Earth
F01	Magnets	E01	Sources of Energy	PA14	Food Chains, Food Webs
		E02	Heat & Temperature	PA15	Habitats
PA07	Naming Plants				
PA08	Things Plants Need	A03	Shadows & Light	G02	Layers of Soil & Rock
PA09	Parts of Plants	C01	Changes in Daily Weather	G03	Kinds of Rocks
		C02	Seasons		
A02	The Sky			A04	Day and Night
				A05	The Moon
				HGR03	Male & Female

This curriculum follows the sequence of units in <Accent on Science>, published by Charles E. Merrill Co.

PM01. Compare and classify solid objects according to property: size, color, shape, weight, density (float and sink), smell, taste, and texture.

UNIT TOPIC: Objects and Their Properties

ESTIMATED DURATION
3-4 weeks

Vocabulary

color
size
shape
weight
float
sink
smooth
rough
dull
shiny
color words
size words
weight words
shape words
texture
taste
smell/odor
sweet
sour
salty
bitter
stink

Subobjectives/Activities

Subobjectives

A. Classify objects according to color.
B. Classify and sequence objects according to size.
C. Classify and sequence objects according to weight.
D. Classify objects according to shape.
E. Classify objects according to density (float and sink).
F. Classify and sequence objects according to texture.
G. Classify objects according to taste.
H. Classify objects according to smell.

Activities

1. Create learning centers for each area of classification.

2. Learn the names of objects as you tell about their properties.

3. Introduce each property with activities. Then write the properties on a chart for students to fill in. Example:

Object	Color	Size/ Weight	Shape	Float/ Sink	Texture	Taste/Smell (for foods)

Materials

TEXTBOOKS

Science, Level 1, Unit 1

Stem, Level 1, Unit 4

S.F. Science, Level 1

Accent on Science,
Level 1, Chapters 1 & 2

ESS, "Sink and Float,"
"Clay Boats"
"Primary Balancing"

CAPTIONED FILMS
F548 In, Out, Down, Over, Under, Upside-Down
F489 A Wheel Is Round
F704 Me and My Senses

FILMSTRIPS
Name the Color (VE)
Big and Little (MDC)
Round and Square (MDC)

4. Sequence objects by color--lightest to darkest
   size--smallest to biggest
   weight--lightest to heaviest
   taste--best to worst
   odor--best to worst

FILMSTRIPS

Hard and Soft (MDC)
Size (BFA)
What Is Red? (CF)
Stories About Colors (CO)
What Can You Taste and Smell? (EB)
Search for Shapes (CF)
Everything Has Lines (CF)
Our Five Senses (CF)
What Can You Touch and Feel? (EB)
What's Big and What's Little? (TA)
Square, Round, and Wiggly (TA)
Shape (BFA)

BOOKS

Tudor, Tasha, Five Senses
Supraner, Robyn, Draw Me a Square
 Draw Me a Triangle
Hoban, Tana, Shapes and Things
 Is It Red?
Thomas, Anthony, Things We Touch
Howard, Katherine, Max, The Nosey Bear
Clure, Beth, Little, Big, Bigger
Bellah, Melanie, Bow! Wow! Meow!
Branley, Franklyn, Floating and Sinking
Carle, Eric, My Very First Book of Colors
 My Very First Book of Shapes
Reiss, John, Colors
Moncure, Jane, Magic Monsters Look for Shapes
Tester, Sylvia, The Parade of Shapes
Miller, J.P., Big and Little
Schneider, Herman & Nina, How Big Is Big?

OTHER MATERIALS

Study Prints:
 Let's Start Chart
 Discovering Shapes
 Color Chart
 Your Five Senses

Our Five Senses (worksheets and activities)
The Five Senses (pictures)
Our Science Table (duplicating masters)

PM02 Describe objects according to their properties.

UNIT TOPIC: Describing Objects
(to be presented in conjunction with PM01.)

ESTIMATED DURATION
Throughout school year

Vocabulary

color
size
shape
weight
smell
taste
texture

Subobjectives/Activities

Subobjectives

A. Identify the category names used to describe objects (color, size, shape, weight, smell, taste, texture).
B. Use category names to describe objects.
C. Describe objects using each of the five senses.
D. Identify an object from a description of its properties.
E. Identify and compare objects based on non-standard units.

Activities

1. Create learning centers with manipulatives for each of the five senses.
2. Identify the categories of such property words as red, small, square, heavy, sweet, rough, etc.
3. Play "I'm thinking of an object...." Describe the properties so other students can guess what it is.
4. Measure weights of objects with beans. Find the heaviest and the lightest. Put objects in sequence by weight.
5. Complete the chart shown in the Activities section of PM01.
6. Measure objects using hands, paper clips, etc.

Materials

TEXTBOOKS

Science, Level 1, Unit 1

Stem, Level 1, Unit 4

S.F. Science, Level 2, Unit 1

Accent on Science
Level 1, Chapters 1 & 2

CAPTIONED FILMS, FILMSTRIPS

Comparing: Getting Ready to Measure
Name the Color (VE)
Size: Big and Small (MDC)
Shape: Round and Square (MDC)
Tough, Hard, Soft (MDC)

BOOKS
Russell, Solveig, Size, Distance, Weight: A First Look at Measuring

OTHER MATERIALS
Our Science Table
(duplicating masters)

A01 Describe the positions of objects relative to a specific reference point.

UNIT TOPIC: Locating Objects in Space

ESTIMATED DURATION
3 days--1 week

Vocabulary

behind
under
above
front
beside
on
near(er-est)
far
farther
farthest
direction
distance
space
locate

Subobjectives/Activities

Subobjectives

A. Use the terms behind, under, above, front, beside, on, etc. to describe the position of an object in relation to a specific reference point.
B. Find and identify objects from descriptions of their positions.
C. Describe the positions of objects in terms of direction and distance (near and far).
D. Locate and identify objects by describing their distances from a reference object.

Activities

1. Play the game "I'm thinking of an object..." Describe the location of an object in relation to you. Have students take turns guessing the object and thinking of objects.

2. Have a treasure hunt. Write descriptions of the positions of objects to be found.

3. Look at magazine pictures. Identify objects that are near or far.

4. Draw a picture based on descriptions of different positions of objects.

Materials

TEXTBOOKS
Stem, Level 1, Unit 1
Level 3, Unit 2

Science, Level 1, Unit 2
Cluster C-1, C-2
Level 1, Unit 3, C-A4

Accent on Science
Level 1, Chapter 1

Science Level 3, Unit 2,
Cluster B-1, B-2

CAPTIONED FILM
F548 In, Out, Up, Down, Under, Upside-Down

OTHER MATERIALS
For materials on astronomy, grades 1-3,
write to: Young Astronaut Council,
1221 Connecticut Ave., NW
Washington, DC 20036

P.003 Classify objects according to multiple characteristics.

UNIT TOPIC: Grouping Objects

ESTIMATED DURATION
1 week

Vocabulary	**Subobjectives/Activities**	**Materials**
alike different sort group property	Subobjectives A. Group objects according to three or more characteristics. B. Explain how objects are alike and different, based on their properties. C. Classify an assortment of objects in several different ways. D. Describe the properties of an object so that others may recognize it. Activities 1. Collect a variety of objects and see how many ways students can group them. 2. Have the teacher or one student group a variety of objects, then the other students must explain how they were grouped. 3. Have students try to guess an object from a list of its properties.	**TEXTBOOKS** ESS, "Attribute Games and Problems" **OTHER MATERIALS** "Attribute" Game "What's in the Square?" Matrix game

PA01 Identify objects as living or nonliving and state characteristics of each.

UNIT TOPIC: **Living or Nonliving Things**

ESTIMATED DURATION
1 week

Vocabulary

- living
- nonliving
- alive
- grow
- move
- food
- water
- air
- babies

Subobjectives/Activities

Subobjectives:

A. Classify a collection of objects as living or nonliving.
B. Identify the characteristics of nonliving things.
C. Identify the characteristics of living things.
D. Compare and contrast living and nonliving objects.

Activities:

1. Sort objects into living or nonliving groups.
2. Cut out magazine pictures of living and nonliving things. Make posters.
3. Observe how living things move.

Materials

TEXTBOOKS

Accent on Science
Level 1, Chapter 3

STEM, Level 1, Unit 4

Science, Level 1, Unit 4

CAPTIONED FILMS

F200 What's Alive?
F524 The Lonely Scarecrow

PA02 Identify and describe the way animals and plants move.

UNIT TOPIC: Animals and Plants Move

ESTIMATED DURATION
1 week

Vocabulary

creep
hop
fly
swim
crawl
walk
run
jump
glide
waddle
fin
leg
wing
flipper
etc.

Subojectives/Activities

Subobjectives:

A. Identify and describe various ways animals move: hopping, flying, swimming, crawling, walking, running, creeping, etc.)
B. Identify some animal body parts that mvoe.
C. Recgonize that plants move in response to light or other stimuli.

Activities:

1. Demonstrate different means of locomotion.

2. Match animals with the ways they move.

3. Experiment to prove that plants move.

4. Find out which animals are fastest and slowest. Make a graph showing the speed of various animals.

Materials

TEXTBOOKS
STEM, Level 2, Unit 4

Science, Level 1, Unit 4, Cluster B-4

CAPTIONED FILM
F1186 Why Animals Look the Way They Do

OTHER MATERIALS
Birds and How They Grow
(National Geographic Kit)
Whales (National Geographic Kit)

PA03 Identify the things animals need for healthy growth and development.

UNIT TOPIC: Things Animals Need

ESTIMATED DURATION
3-4 weeks

Vocabulary

food
air
water
sunlight
meat eater
(carnivore)
plant eater
(herbivore)
predator
omnivore

Subojectives/Activities

Subobjectives:

A. Identify the need for food, water, air and sunlight.
B. Identify and classify animals that eat only plants, only animals, or both plants and other animals.
C. Identify how and where animals get liquids to drink.

Activities:

1. Keep a pet in the classroom. Observe its needs.
2. Keep pets that are meat eaters (snakes), plant eaters (rodents), or both (turtles). Observe their habits.
3. Collect pictures of meat eaters and plant eaters. Make posters.
4. Have students list all the foods they eat for a week, then classify them as coming from plants or animals.
5. Discuss how animals get water, especially in the desert.
6. Visit the zoo. List the animals that eat meat, plants, or both kinds of food.

Materials

TEXTBOOKS

Accent on Science
Level 3, Unit 5

STEM, Level 3, Unit 4

Science, Level 3,
Unit 4, Clusters B-1, B-2

CAPTIONED FILMS

F394	Living and Growing
F553	Animal School; Care of Your Pet
F1142	Me and You, Kangaroo
F754	African Animals: Predators and Pachyderms
F1100	Sea Turtles: Race for Life

OTHER MATERIALS

How Animals Get Food
(National Geographic Kit)
Animal Growth (sequential cards)

PA04 Identify uses of animals.

UNIT TOPIC: Uses of Animals

ESTIMATED DURATION
2 weeks

Vocabulary

fruit
vegetable
nuts
roots
stems
leaves
ham
pork
beef
rubber
clothes
oil
glue
decoration
cosmetic
medicine

Subobjectives/Activities

Subobjectives:

A. Identify and classify animals that are eaten by people and those that are not.
B. Identify common meats and the animals they come from.
C. Identify other uses of plants (medicine, food for animals, decorations, rubber, clothing etc.).
D. Identify other uses of animals (oil, glue, dog food, decoration, cosmetics, clothing, purses, shoes, fur, leather etc.).

Activities:

1. Keep a record of food you eat for one week. Add the name of the plant or animal each food comes from.
2. Match food pictures of the plants or animals they come from.
3. Visit a butcher shop; list meats made from various animals.
4. Classify plants as fruits or vegetables.
5. Identify and classify vegetables as roots, stems, or leaves of plants.
6. Classify foods that grow underground, or above the ground on vines, bushes or trees.
7. Research and report on such topics as:
    Plants Used for Medicine Plants Used for Clothing
    Animals Used for Clothing Animals Used for Cosmetics

Materials

TEXTBOOKS
Accent on Science
Level 4, Unit 9

S.F. *Science*, Level 3, Unit 8

CAPTIONED FILMS

F260	How Plants Help Us
F441	Bees: Backyard Science
F177	Secrets of the Bee World

BOOKS
Gregory, O.B., *Rubber*
Cotton

OTHER MATERIALS
Plants & People (National Geographic Kit)
Understanding Plants (duplicating masters)

G01 Describe some characteristics of rocks and soil.

UNIT TOPIC: Rocks and Soil

ESTIMATED DURATION
3 days

Vocabulary

sand
mud
clay
size words
shape words
texture words
color words
weight words
soil
layer
jar
settle

Subobjective/Activities

Subobjectives:

A. Classify types of soil: sand, mud, clay, etc., and describe their characteristics.
B. Classify rocks by size, shape, texture, weight, and color.
C. Observe and distinguish between soil layers.

Activities

1. Observe and identify rocks, sand, soil, mud, and clay.
2. List the characteristics of rocks, sand, soil, mud, and clay.
3. List similarities and differences of the various kinds of soil.
4. Experiment: Identify kinds of soil by feel and smell.
5. Experiment: Try to grow seeds in various kinds of soil.
6. Experiment: See how much water can be absorbed by each kind of soil, and how quickly.
7. Classify rocks by size, shape, texture, weight, and color.
8. Sequence rocks by size, texture, weight, and color.
9. Predict the weights of some rocks.

Materials

TEXTBOOKS
Accent on Science,
Level 1, Chapter 6

S.F. Science, Level 3,
Unit 4, Chapter 8

ESS, "Rocks and Cherts"

FILMSTRIPS
Look About You (EGH)
What Is Soil? (EB)

OTHER MATERIALS
Our Science Table (duplicating masters)

90

98

10. Experiment: Put rocks, sand, and soil in a jar of water. Shake the jar and allow it to settle. Draw and describe the layers that form.

11. Experiment: Make layers of lint or other materials. Identify and count the layers.

12. Observe layers in rocks. Collect layered rocks.

13. Experiment: Dig a deep hole in the soil, or take a core sample of soil. Try to identify the different layers.

PA05 Observe and identify a variety of animals that live in different habitats.

UNIT TOPIC: Animals on Land, in Water, and in the Air.

ESTIMATED DURATION
3-4 weeks

Vocabulary

land
water
air
country
city
animal names
fresh water
salt water
forest
desert
mountain
farm
pet

Subobjectives/Activities

Subobjectives:

A. Identify animals that live on land (forests, deserts, mountains, etc.).
B. Identify animals that live in water (fresh and salt).
C. Identify animals that can fly through the air.
D. Identify animals that can live on both land and water.
E. Classify animals that live on land, in the water, or on either land or water.
F. Classify animals as living in the country or in the city.
G. Identify animals kept as pets.

Activities:

1. Classify animals that live on land, in water, in both land and water, or fly in the air.

2. Cut out magazine pictures of farm or city animals. Make posters.

3. Classify animals that live in forests, deserts, mountains.

4. Set up terrariums (desert or tropical plants).

5. Make a book showing and labeling animals that live on land, in water, or in the air.

6. Have a contest. Ask the students to list all the animals they can in 10 minutes. Combine to make a master list.

7. Bring in a picture of a mystery animal. The first student to identify it gets a prize.

Materials

TEXTBOOKS
Science, Level 2, Unit 4

S.F Science, Level 2, Unit 8

CAPTIONED FILMS

F122	Farm Babies and Their Mothers
F42	Zoo Baby Animals
F963	A Visit to a Pond
F496	A First Film on Insects
F582	Z is for Zoo
F522	Zoo Animals in Rhyme

FILMSTRIPS
Let's Go to the Zoo (JH)
John's New Pet (CF)
Tim's Pet (CF)
Visit to the Zoo (CF)
Peter Works at the Pet Store (EGH)
The Browns at the Zoo (CF)

BOOKS
Cole, Joanna, Large as Life: Nighttime Animals
Large as Life: Daytime Animals

102

101

PA05 Observe and identify a variety of animals that live in different habitats (continued).

FILMLOOPS
Story of a Squirrel (Coronte)
Farm Animals (KDES)
Zoo Trip
Zoo Trip
Story of a Frog
Story of a Kitten
Story of a Turtle

OTHER MATERIALS
Animal Puzzles
Animal Box
Domestic Animals
Wild Animals
Farm Animals
Farm Animals
Zoo Animal Booklets
Pets (Reference Book for Teachers)
Plants & Animals (duplicating masters)

National Geographic Kits
    Birds and How They Grow
    Farm Animals

SUGGESTED FIELD TRIPS
Zoo, children's zoo, petting zoo
Farms, pet farms, farm parks

103

PA06 Identify animal homes and describe where and how they are constructed.

UNIT TOPIC: Animal Homes

ESTIMATED DURATION
1-2 weeks

Vocabulary

animal names
names of animal homes
(Examples: fox/den, bird/nest, praire dog/burrow, bear/cave, beaver/lodge

Subobjectives/Activities

Subobjectives

A. Identify and match animals and their homes.
B. Identify various materials that animals use to build their homes.
C. Identify various places where animals build their homes.
D. Classify animal homes built on the ground, underground.
E. Construct homes for various animals.

Activities:

1. Match pictures of animals to pictures of their homes.

2. Collect bird nests in the fall. Observe and compare them.

3. Construct bird houses, terrariums, aquariums, homes for rodents, ant farms.

4. Match the animal name to the name of its home.

5. Write a report about one animal and its home.

Materials

TEXTBOOKS

S.F. Science, Level 2, Unit 8

Science, Level 2, Unit 4

CAPTIONED FILMS

F1045	Animal Architecture
F88	Animal Homes
F101	Bird Homes
F664	An Aquarium in Action

BOOKS

Shapp, M. & C., Animal Homes
Blough, Glenn, Who Lives in This House?
Booth, Eugene, Under the Ground
Morris, Dean, Animals That Burrow

OTHER MATERIALS

Animal Homes (National Geographic Kit)
Plants & Animals (duplicating masters)

F01 Identify various kinds of magnets and the objects they attract.

UNIT TOPIC: Magnets

ESTIMATED DURATION
1 week

Vocabulary

magnet
bar magnet
U-shaped
horseshoe
magnet
compass
attract
repel
pole
like
unlike

Subobjectives/Activities

Subobjectives

A. Identify and label different kinds of magnets.
B. Classify objects that are attracted or repelled by magnets.
C. Identify the poles of a magnet.
D. Identify some common uses of magnets.

Activities

1. Label different kinds of magnets.

2. Classify objects that are attracted or repelled by magnets. Make predictions first.

3. Show how the poles of a magnet point north and south.

4. Experiment to see how *unlike* poles of a magnet attract and *like* poles repel.

5. Make a compass using a magnet.

6. Have a magnet race. Draw a path on a piece of paper. Hold the paper flat. Put paper clips on top of the paper and hold magnets under the clips. Use the magnets to move the paper clips from a starting point to the end.

7. Identify machines that use magnets.

Materials

TEXTBOOKS

S.F. *Science*, Level 3,
Unit 3, Cluster B-1

Accent on Science, Level 1, Chap.7

CAPTIONED FILMS

F556 Magnets and Their Uses
F557 Magnets for Beginners

FILMSTRIPS

Different Kinds of Magnets (JH)
Magnets Help Find Direction (JH)
Magnets Can Attract Through Objects (JH)
Finding Out About Magnets (SVE)
Magnets (JH)
Working With Magnets

BOOKS

Branley, F., *Mickey's Magnet*
Starting Point Library, *Magnets*

OTHER MATERIALS

SAVI Kit: Magnetism & Electricity
000-748 Our Science Table
000-822 Readiness in Science
(duplicating masters)

PA07 Observe and identify a variety of plants and tell where they grow.

UNIT TOPIC: Naming Plants

ESTIMATED DURATION
2-3 weeks

Vocabulary

soil
water
air
size
color
smell
plant
plant names

Subobjectives/Activities

Subobjectives:

A. Identify plants that grow in soil.
B. Identify plants that grow in water.
C. Identify plants that grow in air.
D. Identify plants that grow in soil, in water, and in air.
E. Classify plants by size, color, smell.

Activities:

1. Collect and label plants that grow in soil, water, air. Display them in the classroom.
2. Classify and label plants by size, color or smell.
3. Plant a garden. Label the plants.
4. Set up a terrarium or an aquarium. Label the names of the plants in it.
5. Visit an arboretum or botanical garden. Write down the names of plants that you see.
6. Have a contest. Ask students to list as many plants as they can in 10 minutes. Combine to make a master list.
7. Learn the names of trees around the school. Collect their leaves and make a book.
8. Bring in a mystery plant. The first student to identify it gets to keep the plant.

Materials

TEXTBOOKS

Accent on Science, Level 1, Chap. 9

Science, Level 1, Unit 4

STEM, Level 2, Unit 4

S.F. Science, Level 2, Unit 7

CAPTIONED FILMS

F446	Summer Is Here
F138	How Does a Garden Grow?
F839	Greenhouse

OTHER MATERIALS
The Blooming Game

PA08 Identify the things plants need for healthy growth and development, and describe what happens when those needs are not met.

UNIT TOPIC: **Things Plants Need**

ESTIMATED DURATION
3-4 weeks

Vocabulary

water
light
air
soil
food
amount
vary
change

Subobjectives/Activities

Subobjectives:

A. Identify the need of plants for water, light, air, soil, and food.
B. Observe and describe what happens to plants when they are deprived of water or light, grown in various types of soil, or placed in cold surrondings.
C. Compare plants grown under different conditions.

Activities

1. Experiment to see what happens when plants are grown under different conditions:

   - o In bright or dim light.
   - o With varying amounts of water.
   - o With varying amounts of soil.
   - o With different types of soil.
   - o In varying temperatures.
   - o With and without music.

   Make a chart to show the results.

2. Make a terrarium, and try to find the best conditions for the plants in it.

3. Have students grow plants at home for one month. The student whose plant is healthiest at the end of a month wins a prize.

Materials

TEXTBOOKS

S.F. Science, Level 2, Unit 7

Accent on Science,
Level 3, Unit 5

Stem, Level 2, Unit 4

Science, Level 1, Unit 4

CAPTIONED FILM
F138 How Does a Garden Grow?

111

110

PA09 Identify parts of plants.

UNIT TOPIC: Parts of Plants

ESTIMATED DURATION
1-2 weeks

Vocabulary

leaf
flower
stem
root
fruit
truck
branch
function
names of
different
trees

Subobjectives/Activities

Subobjectives:

A. Identify parts of a plant: leaves, flower, stems, roots, fruit, trunk, branch, etc.
B. Identify parts of plants people eat.
C. Compare similarities and differences between different plants.
D. Compare leaves of different trees.

Activities:

1. Label the parts of a plant.
2. Match foods to various parts of plants, for example: lettuce/leaf; carrot/root.
3. Compare the parts of different plants (fruits, leaves, stems, roots, etc.) List similarities and differences.
4. Collect leaves from various trees in the fall. Make a leaf identification book.
5. Make leaf prints to decorate the classroom.

Materials

TEXTBOOKS
S.F. *Science*, Level 1, Unit 7

Accent on Science,
Level 1, Chapter 10

CAPTIONED FILMS
F578 What Do Flowers Do?
F579 What Do Seeds Do?

BOOKS
Manley, Deborah
Let's Grow Things

OTHER MATERIALS
A Look At Plants
(National Geographic Kit)
Understanding Plants
(duplicating masters)
Our Science Table
(duplicating masters)

A02 Identify and describe objects in the sky.

UNIT TOPIC: The Sky

ESTIMATED DURATION
1 week

Vocabulary

day
night
light
dark
twilight
sunrise
sunset
dusk
sun
moon
clouds
sky
stars
earth
afternoon
evening

Subobjectives/Activities

Subobjectives

A. Identify day, night, light, dark, twilight, sunrise, sunset, dusk.
B. Identify sun, moon, clouds, sky, stars, Earth, other planets, Big Dipper.
C. Identify morning, afternoon, and night, and describe the events that happen during each time period.
D. Describe objects in the sky.

Activities

1. Match pictures of objects in the sky to their labels.
2. Classify events that happen by time of day: morning, afternoon, night (evening).
3. Write descriptions or poems about objects in the sky.
4. Investigate astrological signs and the constellations that go with them.
5. Go on a field trip to an observatory, or use pictures to observe and identify the following objects and their characteristics.
    - a. sun (brightness, color, placement)
    - b. clouds (shape, color, placement)
    - c. stars (brightness, placement)
    - d. moon (shape, color)
    - e. planets (size, color, temperature)
6. Look in the newspaper to find the times for sunrise and sunset. Keep a chart for a month. Look for a pattern.

Materials

TEXTBOOKS

Stem, Primer Level
ESS, "Where Is the Moon?,"
"Daytime Astronomy"

FILMSTRIPS

AU25	Sky-Wise (EGH)
CQ-8	Morning, Noon and Night (TA)

BOOKS

Englebrektson, June, *The Sun Is a Star*
Ginsburg, Mirra, *Good Morning, Chick*
Wonder Starters, *Sun*
Branley, Franklyn,
The Sun: Our Nearest Star
Camden, Betty,
Good Morning, Good Night
Wright, Betty R., *Good Morning Farm*

PA10 Describe the life cycles of familiar animals.

UNIT TOPIC: Animal Life

ESTIMATED DURATION
3-4 weeks

Vocabulary

young
care for
hatch
life cycle
lamb
calf
chick
piglet
puppy
kitten
kid

Subojectives/Activities

Subobjectives

A. Match baby animals to their parents.
b. Classify animals that take care of their young and those that do not.
C. Classify animals that hatch from eggs and those that are born alive.
D. Describe the life cycles of several familiar animals: chickens, frogs, fish, butterflies, etc.

Activities:

1. Match baby animals to their parents.

2. Identify names of baby animals such as:
   cub/bear
   lamb/sheep
   calf/cow
   chick/chicken
   piglet/pig
   puppy/dog
   kitten/cat
   kid/goat

3. List animals that care for their young and those that don't, those that hatch from eggs, and those that are born alive.

4. Arrange in sequence pictures of the life cycles of familiar animals: chicken, frogs, fish, butterflies, etc.

5. Observe the life cycles of animals: frogs, butterflies, fish, gerbils, meal worms, etc. Draw pictures of each stage of the life cycles.

Materials

TEXTBOOKS

Accent on Science,
Level 2, Chapter 1

S.F. Science, Level 2, Unit 2

CAPTIONED FILMS

F234	Kittens: Birth and Growth
F394	Living and Growing
F819	Wildlife Families
F531	Animals Hatched from Eggs
F90	Animas in Spring
F1189	About Cats
F1126	Elsa and Her Cubs
F1109	The Apes
F107	The Butterfly
F500	Frogs and How They Live
F1044	An Angelfish
F757	The Big Green Caterpillar

OTHER MATERIALS

Whales (National Geographic Kit)
Spiders " " "
Birds " " "
Butterflies " "
Animal Families " "
Matching Mothers and Babies
Our Science Table (duplicating masters)

BOOK

Seventy, Vincent, Kookaburro

PA 1 Identify body parts of animals and describe their functions.

UNIT TOPIC: Animal Body Parts

ESTIMATED DURATION
2-3 weeks

Vocabulary

eye
ear
tail
feet
paws
legs
nose
mouth
fur
shell
scales
feather
beak
hair
fang
hoof
flipper
fin
claw
fingernail
tail
names of various animals
function

Subobjectives/Activities

Subobjectives

A. Identify general body parts: eye, ear, tail, feet, paws, legs, nose, mouth, etc.
B. Identify body coverings of animals: fur, scales, shells, feathers, hair.
C. Identify and compare mouth parts of different animals: mouth, beak, fangs, etc.
D. Identify and compare extremities of different animals: paws, hooves, flippers, fins, claws, fingers, tails, etc.
E. Identify the functions of various body parts of animals.

Activities

1. Collect pictures of various animals; label the parts.
2. Classify animals according to their body coverings.
3. Classify animals by kinds of extremities: feet, paws, hooves, flippers, fins, claws, fingernails, etc.
4. Match animal body parts to their functions.
5. Contest: list as many animals as you can that have______. (fur, scales, paws, claws, fins, etc.)

Materials

CAPTIONED FILM
F1096 What Animals See

OTHER MATERIALS
Whales (National Geographic Kit)

S01 Identify various sounds in the environment and how they are produced.

UNIT TOPIC: Sounds Around Us

ESTIMATED DURATION
1 week

Vocabulary

high
low
loud
soft
vibrate
noise
siren
horn
honk
ring
bell
knock
music

Subobjectives/Activities

Subobjectives

A. Identify objects that vibrate and produce sound.
B. Recognize that vibrating objects cause the air around them to vibrate.
C. Classify loud and soft sounds.
D. Classify high and low sounds.
E. Identify sounds that are useful to people (sirens, horns, bells).
F. Define noise and discuss ways to reduce it.

Activities

1. Match sounds to the objects that produced them.

2. Feel the vibrations of various objects: tuning fork, guitar string, stretched rubber band, vocal cords, etc.

3. Observe the vibrations when a pan of water is tapped on its rim with a pencil.

4. Identify sounds that each student can and cannot hear. Discuss why they hear some sounds and not others.

5. Discuss how hearing aids help hearing-impaired people.

Materials

TEXTBOOKS
Accent on Science,
Level 2, Unit 2

See the Audiologist and/or the Auditory Training Curriculum Guide for more activities

S02 Identify causes and implications of deafness.

UNIT TOPIC: Causes of Deafness

ESTIMATED DURATION
1-2 weeks

Vocabulary

conductive
sensori-neural
cause
hearing loss
deaf
hearing-impaired

Subobjectives/Activities

Subobjectives
A. Identify cause of one's own deafness.
B. Identify other causes of deafness.
C. Identify different types of deafness.
D. Discuss personal reactions to deafness.

Activities
1. Have students report on the causes of their own deafness, with help from parents or an audiologist as needed.
2. Keep a class chart showing the various causes of deafness among classmates. Interview other students to learn what caused their hearing loss. Add those causes to the chart.
3. Do research on one cause of deafness. Write a report.
4. Have the audiologist visit your classroom to talk about causes of deafness.

Materials

TEXTBOOKS

Deyo, D. and L. Erting, Sound and Hearing: An Instructional Unit for Deaf Students, Objective 2

S03 Explain the use and care of hearing aids.

UNIT TOPIC: Use and Care of Hearing Aids

ESTIMATED DURATION
1 week

Vocabulary	**Subobjectives/Activities**	**Materials**
body aid over-the-ear aid battery battery tester cord ear mold amplifier switch	Subobjectives A. Identify different kinds of hearing aids. B. Identify the parts of a hearing aid. C. Identify the kind of battery for one's own hearing aid and demonstrate the ability to test it. D. Identify procedures for caring for a hearing aid. Activities 1. Compare hearing aids used in the classroom. List ways they are alike and different. 2. Label the parts of a hearing aid. 3. Find out the cost of a hearing aid. 4. Compare batteries for different hearing aids. List ways they are alike and different. 5. Calculate the cost of batteries for one year. 6. Demonstrate the following: o How to clean the earmold. o How to test the battery. o How to turn the aid on and off. o How to replace the battery. o How to test the hearing aid with the telephone.	

PM04 Measure and compare objects and events using non-standard and standard units.

UNIT TOPIC: Measuring and Comparing Objects

ESTIMATED DURATION
2 weeks

Vocabulary

measure
unit
length
width
area
weight
volume
hour
day
week
month
year
names of days
names of months

Subobjectives/Activities

Subobjectives

A. Measure length and width in non-standard units.
B. Measure area using non-standard and standard units.
C. Measure weight of various objects using non-standard and standard units.
D. Compare volumes of different containers.
E. Identify units of time: hour, day, week, month, year.

Activities

1. Measure length and width of various objects, using paper clips. Compare and record the measurements. Then measure the same objects in centimeters (cm) using a unit stick.

2. Measure area of a postcard using a stamp; count stamp units.

3. Weigh several objects on a simple balance scale, using dried beans. Count the beans to compare the weights of different objects. Record the measurements on a chart or graph.

4. Weigh each student in the class on a bathroom scale. Compare the weights. Record on a chart or graph.

5. Use liquid to compare the volume of several containers. Identify containers with smallest and largest volume.

6. Compare the volume of various sizes of milk cartons.

Materials

TEXTBOOKS

Accent on Science,
Level 2, Unit 3

Stem, Level 1, Unit 2

Science, Level 2,
Unit 2, Cluster C-1, C-2

Science, Level 3,
Unit 2, Cluster A-1, A-2, B-1

PM04 Measure and compare objects and events using non-standard and standard units.

7. Look at a calendar: Name the days of the week.
   Count the weeks in a month; in a year.
   Name the months.
   Count the months in a year.
   Mark birthdays and holidays on a calendar.

8. Find out how many hours are in a day. How many hours do you spend in school every day? Sleeping at night?

HGR01 Identify and describe what humans need for growth and development: food, air, water, shelter, exercise, love.

UNIT TOPIC: Human Needs

ESTIMATED DURATION
1 week

Vocabulary	**Subobjectives/Activities**	**Materials**
food shelter air water love exercise	Subobjectives: A. List the needs of humans and compare them to the needs of other organisms. B. Describe ways in which people can satisfy their needs. C. Discuss what happens if these needs are not met. Activities 1. Cut out pictures of things people needs from magazines. Make posters showing human needs. 2. List ways people can satisfy their needs. 3. Match people's needs to the ways they satisfy them. 4. Discuss problems of hunger around the world. 5. Discuss what happens to people when their needs are not met.	**TEXTBOOKS** *Accent on Science*, Level 1, Chapter 3 *Science*, Level 1, Unit 4, Cluster B-6 *Stem*, Level 1, Unit 4 S.F. *Science*, Level 2, Unit 1

HGR02 Identify human body structures and describe their functions.

UNIT TOPIC: Human Body Parts

ESTIMATED DURATION
2-3 weeks

Vocabulary

body parts
senses
eye
ear
nose
tongue
skin
head
teeth
lips
cheeks
eyelids
face
hair
eyebrows
eyelashes
chin
forehead
arm
leg
calf
thigh
ankle
foot
toe
knee
chest
breast
navel
(other body part words as needed)

Subobjectives/Activities

Subobjectives:

A. Identify the five sense organs and explain their functions: eye, ear, nose, tongue, and skin.
B. Identify parts of the face and head and their functions: head, face, teeth, lips, cheeks, eyelids, hair, eyebrows, eyelashes, chin, forehead, hair, jaw, etc.
C. Identify other body parts and their functions: arm, leg, calf, thigh, lmee. ankle, foot, toe, chest, navel, breast, hand, finger, breast, penis, vagina, waist, thumb, hip, shoulder, elbow, neck, fingernail, toenail, etc.
D. Identify, locate, and describe the functions of basic internal body structures: stomach, heart, lungs, muscles, brain, blood, etc.

Activities

1. Demonstrate the uses of the five sense organs.
2. Match labels to body parts.
3. Describe a body part so that other students can guess it.
4. Role-play a body part. Have other students guess it.
5. Play the Password game using body part vocabulary.
6. Draw a complete person with all basic body parts.

Materials

TEXTBOOKS
S. F. Science, Level 2, Unit 1

OTHER MATERIALS
Body Parts (duplicating masters)
Spelling Body Part Words

HSN01 Identify and describe good health practices.

UNIT TOPIC: Good Health Practices

ESTIMATED DURATION
1-2 weeks

Vocabulary

junk food
nutrition
balanced meal
exercise
germs
cover
sneeze
cough
dentist
toothbrush
toothpaste

Subobjectives/Activities

Subobjectives

A. Classify foods as nutritious or not nutritious.
B. Identify balanced meals.
C. Identify good hygiene practices (washing hands, brushing teeth, daily bath, etc.).
D. Recognize the need for plenty of exercise, sunshine, and sleep.
E. Recognize that illness can be caused by germs. Identify basic ways to stop the spread of germs (covering mouth and nose when sneezing or coughing, washing hands, not wearing other's clothes, not putting objects in the mouth, not sharing utensils, etc.).
F. Identify good dental hygiene practices.

Activities

1. Cut pictures out of magazines and make collages showing nutritious foods and junk foods.

2. Classify meals as balanced or not balanced.

3. Plan and cook several balanced meals.

4. Keep a record of meals at home or school. Decide whether they are balanced or not balanced.

5. List good hygiene practices and when they are necessary.

6. Discuss why people need sunshine, exercise, and sleep.

7. Make posters to teach other students about ways to prevent the spread of germs.

8. Visit a dentist's office to learn about good dental hygiene.

Materials

TEXTBOOKS
Accent on Science
Level 2, Chapter 4

S.F. Science
K Level, Unit 3

CAPTIONED FILMS
Eat well, Grow Well
Fitness Skills for Children
Being responsible: Your Health
Habits of Health: Keeping in Top Shape
Personal Health for Girls
Sanitation: Why all the fuss?

FILMSTRIPS
Health Stories (EB)

OTHER MATERIALS
Health and Safety Sequence Cards

HSN02 Identify and describe good safety practices.

UNIT TOPIC: Good Safety Practices

ESTIMATED DURATION
2 weeks

Vocabulary

poison
label
warn
danger
caution
accident
stranger
matches
safety
pedestrian
rabies

Subobjectives/Activities

Subobjectives

A. Classify substances as poisonous or not poisonous.
B. Identify warning labels and warning words.
C. Identify procedures to follow in an emergency such as fire theft, sickness, accident, etc.
D. Identify "stranger dangers."
E. Identify safety precautions for matches and fire.
F. Identify rules of the road for pedestrians and bicyclists.
G. Recognize that animals can be dangerous (bites, rabies, other diseases).

Activities

1. Look for warning words on labels.
2. Make an emergency plan for your family in case of a fire. Share it with the class.
3. Learn the TTY numbers for fire, police, ambulance, etc.
4. List rules for dealing with strangers. Role play stranger dangers.
5. Visit a fire station to learn about fire prevention and safety around fire.
6. Make posters to educate others about fire, strangers, poisons, rules of the road, and animals.
7. Discuss and demonstrate the proper way to ride a bicycle (proper hand signals, equipment).
8. List rules for dealing with strange animals. Discuss the need for caution.

Materials

CAPTIONED FILMS

F468	Safety on the City Streets
F378	Safety Rules for Schools
F996	School Bus Evacuatuon for Students
F777	Your Chance to Live: Forest Fire
F950	Safety as We Play
F43	Safety at Home
F928	Animals Can Bite
F596	Bicycle Riding Reminders
F1465	Bicycle Safety: Stop, Search, and Assess
F640	Read the Label and Live
F946	Playground
F990	Primary School Bus Safety
F630	Redlight, Greenlight

FILMSTRIPS

I'm No Fool With a Bicycle (EB)
I'm No Fool With Fire (EB)
I'm No Fool With Water (EB)
I'm No Fool as a Pedestrian (EB)
I'm No Fool Having Fun (EB)
How to Have an Accident in the Home (EB)
Playing Safe on Streets and Sidewalks (FH)
Playing Safe at Home (FH)
Playing Safe at School (FH)
Playing Safe in Parks & Playgrounds (FH)

OTHER MATERIALS

Safety--1-12 (study prints)
Health & Safety Sequence Cards

HSN03 Identify reasons and procedures for taking medicines.

UNIT TOPIC: Taking Medicine

ESTIMATED DURATION
1 week

Vocabulary

medicine
pharmacist
doctor
drug
harm
medicine cabinet

Subobjectives/Activities

Subobjectives

A. Differentiate between medicines and non-medicines.
B. Identify reasons for taking medicines.
C. Identify people who are authorized to give medicines.
D. Recognize that drugs can be harmful.

Activities

1. Bring in clean, empty medicine bottles and boxes and a variety of other containers. Classify containers for medicines and for other materials. Read labels.

2. Get "Mr. Yuk" stickers from your local poison control center. Put them on medicines.

3. Brainstorm: "How do you feel when you are sick?" Write responses on the blackboard to make a cognitive map.

4. Brainstorm: "What things help people get well?" Write ideas on a cognitive map.

5. Label items from a doctor bag and tell what each is used for: thermometer, stethescope, etc.

6. Label pictures of people who are authorized to give medicine: parents, doctor, pharmacist, dentist, nurse.

7. Color a picture showing someone who took too much medicine.

8. Discuss why pharmacists use childproof caps on medicine.

Materials

BOOKS

Coloring Books: Soozie Says, Only Sick People Need Drugs!
Katy's Coloring Book About Drugs and Health
(US Government Printing Office)

CAPTIONED FILM

F640 Read the Label and live

E01 Identify forms of energy, their sources and uses.

UNIT TOPIC: Sources of Energy

ESTIMATED DURATION
2-3 weeks

Vocabulary

energy
source
light
heat
sound
electricity
sun
stove
iron
light bulb
star
fire
battery
lightning
radio
television
tape recorder
voice
radiator
machine

Subobjective/Activities

Subobjectives

A. Identify sources of mechanical energy and their uses.
B. Identify sources of electricity and their uses.
C. Identify sources of light and their uses.
D. Identify sources of heat and their uses.
E. Identify sources of sound and their uses.

Activities:

1. Bring in sources of mechanical energy such as wind-up toys, simple machines.
2. Cut pictures from magazines showing sources of heat, light, electricity, sound, and mechanical energy. Make posters or bulletin boards.
3. Match pictures of energy sources to their labels.
4. Make a display of musical instruments, toys or real.
5. Ask students to list as many sources of heat as they can think of. Compare lists and make one master list. Repeat with other forms of energy.

Materials

TEXTBOOKS

Accent on Science
Level 2, Chapters 2, 5, 6

Science, Level 3, Unit 3

S.F. Science,
Level 1, Unit 6

STEM, Level 2, Unit 3

OTHER MATERIALS

Readiness in Science
(duplicating masters)

E02 Identify sources of heat and ways to measure it.

UNIT TOPIC: Heat and Temperature

ESTIMATED DURATION
1 week and ongoing

Vocabulary

temperature
boiling
freezing
degree
scale
Fahrenheit
Celsius
measure
record
thermometer
hot
heat

Subobjectives/Activities

Subobjectives

A. Identify sources of heat energy.
B. Explain the function of a thermometer.
C. Measure and record daily temperatures.
D. Identify boiling and freezing temperatures on Celsius and Fahrenheit thermometer scales.
E. Measure body temperature.
F. Predict the temperature of a substance based on touch and other observable factors.
G. Explain the transfer of heat energy from one object to another.
H. Demonstrate safe ways to handle hot substances.

Activities

1. Use an outdoor thermometer to take daily temperatures.
2. Experiment to find boiling and freezing temperatures on Fahrenheit and Celsius thermometers.
3. Take your body temperature before and after vigorous exercise. Explain the difference.
4. Experiment: Predict the temperature of a substance based on touch and other observable factors.
5. Take your body temperature orally, on the forehead, and under one arm. Which is most accurate? Why?
6. Experiment: Put different food colors in cold or hot water. Does the color affect the temperature?
7. Put salt in water. Does it affect the freezing point?
8. Make your own thermometer.

Materials

TEXTBOOKS
Accent on Science, Level 2, Chapter 5 & 7

STEM, Level 3, Unit 7

Science, Level 3, Unit 1 Cluster B-2

S.F. Science, Level 2, Unit 4, Chapters 7 & 8

ESS, "Ice Cubes"

FILMSTRIPS
Exploring Cold (VE)
Temperature: Hot/Cold (MDC)

CAPTIONED FILM
F688 Heat for Beginners

OTHER MATERIALS
SAVI Science Kit: Measurement
Study Prints: Energy & Matter
Weather Instruments
Celsius Thermometers
Small Celsius Thermometers
Heat, Light, & Sound (duplicating masters)

BOOKS
Feravolo, R., Jr. Science Book of Heat
Parker, B., Thermometers, Heat, and Cold

A03 Investigate shadows and light.

UNIT TOPIC: Shadows and Light

ESTIMATED DURATION
1 week

Vocabulary

shadow
light source
shape
transparent
translucent
opaque
size
sharpness
cast

Subobjectives/Activities

Subobjectives

A. Identify the elements necessary to produce a shadow.
B. Infer the shape of an object by looking at its shadow.
C. Identify which objects make the best shadows (transparent, translucent, or opaque).
D. Predict the direction the shadow will fall when the light source is placed in various locations.
E. Predict size, sharpness, shape of a shadow from information given about the object, source of light, and screen.
F. Infer the location of the sun in the sky from shadows.
G. Using the sun as a light source, predict where a shadow will be at various time periods.

Activities

1. Let students try to make shadows. Ask what they need to make them.

2. Look at mystery shadows and identify what made them.

3. Investigate to find out which materials produce the best shadows (transparent, translucent, or opaque materials).

4. Predict which direction the shadow will fall as the light source is moved around.

5. Show pictures of shadows at various times during the day. Students should infer the direction of the sun in the sky and the time of day.

6. Make a sundial.

7. Predict what time your shadow will be the longest and shortest. Do an experiment to find out.

8. Make a shadow stick: Pound a nail into the middle of a flat board. Use a flashlight as the sun to see changes in the shadow.

Materials

TEXTBOOKS
Stem, Level 3, Unit 4

Science, Level 4,
Unit 2, Cluster C-1

Accent on Science,
Level 2, Chapter 6
S.F. Science, Level 1,
Unit 6, Chapter 11

ESS, "Daytime Astronomy"
"Light and Shadows"

FILMSTRIPS
X-40 Shadows (WR)

C01 Observe, name, and record daily changes in weather.

UNIT TOPIC: Changes in Daily Weather

ESTIMATED DURATION
Throughout school year

Vocabulary

hot
cold
warm
cool
sunny
rainy
snowy
cloudy
windy
calm
weather
temperature
degree
rainfall
wind vane
fog
drizzle
shower
thunder
lightning
dew
frost

Subobjectives/Activities

Subobjectives

A. Name and record daily relative temperatures.
B. Name and record general weather conditions.

Activities

1. Observe and describe daily weather changes. Record on charts, graphs or calendars.
2. Use instruments to measure and record relative rainfall, temperature, wind direction, etc. Record on charts or graphs.
3. Make models of weather instruments.
4. Predict the weather for tomorrow.
5. Bring in weather information from the newspaper.
6. Choose a class "weather person" every week to record the daily weather and make a graph at the end of the week.

Materials

TEXTBOOKS

Science, Level 1
Unit 3, Cluster C-1

Exploring Science,
Unit 6

Accent on Science,
Level 2, Chapter 7

S.F. Science, Level 1
Unit 8, Chapter 16

S.F. Science, Kindergarten,
Unit 6

BOOKS

Wonder Starters, Rain; Snow
Thompson, Brenda, The Winds That Blow
Branley, Franklyn, Snow Is Falling
  Rain and Hail
  Air Is All Around Us
  Flash, Crash, Rumble, and Roll
Hatch, Shirley C., Wind Is to Feel
Kalna, Robert, Rain
Keats, Ezra Jack, The Snowy Day
Thompson, Brenda, The Winds That Blow

BOOKS

McGrath, Thomas, About Clouds
Friskey, Margaret, The True Book of Air Around Us
Brown, Sam, Bubbles, Rainbows, and Mirrors
Fergvolo, Rocco B., Jr. Science Book of Weather Experiment
Lowery, Lawrence, Clouds, Rain, Clouds Again
Williams, Barbara, I Know a Weatherman
Moncure, Jane B., What Causes It?
Pine, Tillie S., Weather All Around
Tester, Sylvia Root, Magic Monsters Learn About Weather

CAPTIONED FILMS

F689	A Kite Story
F81	Weather for Beginners
F949	Rain
F413	Rainshower
F137	How Air Helps Us
F688	Heat for Beginners
F1815	The Snowy Day
F580	Sun
F569	Wind
F439	A First Film on the Wind
F125	Flying a Kite
F146	Introducing Air

STUDY PRINTS

Weather Phenomena
Weather Instruments
Learning About Weather

FILMSTRIPS

Weather and People (NG)
Weather Experiments (CP)
We Can Make Simple Weather Instruments (VE)
Rain, Hail, Sunshine--The Story of Weather (TA)
Wind (WR)
Busy Wind, Our Invisible Friend (FH)
Weather Changes
Our Weather
Air, Wind, and Weather (EGH)
Why Does It Rain? (FH)
Why Do We Have Wind? (FH)
Why Do We Have Warm and Cold Days? (FH)

OTHER MATERIALS

Air and Weather
Understanding Weather
Weather Elements
Today's Weather Box
Weather Chart
Weather (flannel board, pieces)
When it Rains (puzzle)
What Air Can Do (National Geographic Kit)
We Dress for Weather

C02 Identify and describe distinct features of the four seasons.

UNIT TOPIC: Seasons

ESTIMATED DURATION
3-4 weeks (Review at beginning of each season.)

Vocabulary

season
winter
spring
fall
autumn
summer
weather
months of the year
deciduous
evergreen
frost
harvest
sleet
snow flurry
dormant
hibernate
buds
bloom
humid

Subobjectives/Activities

Subobjectives

A. Describe the distinct features of summer (months, effect on the environment, temperature, etc.).
B. Describe the distinct features of fall.
C. Describe the distinct features of winter.
D. Describe the distinct features of spring.

Activities

1. Make a book about each season. Add illustrations.
2. Write a report describing the features of each season.
3. Brainstorm characteristics of each season; use webbing or mapping.
4. Take a survey to find out which season people in your school like the best and why. Make a chart or graph to illustrate the results.
5. Write an essay "Why I Like _______ the Best" (fill in the name of the season).
6. Make a chart that shows the major holidays, sports, and appropriate clothing for each season.
7. Find out the exact starting dates for each season.

Materials

TEXTBOOKS

Accent on Science
Level 2, Chapter 8

Science, Level 1
Unit 3, Cluster C-1

S.F. Science, Kindergarten
Unit 6

BOOKS:

Radlaver, Ruth, About Four Seasons and Five Senses
Graham, Ada, Let's Discover Changes Everywhere
Graham, Jory, Children on a Farm
Howell, Ruth, Everything Changes
Parker, B., Wonders of the Seasons
Provensen, Alice, A Book of Seasons
Allington, R., & Krull, K.,
    About Autumn
    About Summer
    About Spring
    About Winter
Graham, Ada & Frank, Winter Woods

C02 Identify and describe distinct features of the four seasons (continued)

CAPTIONED FILMS:

F459	Winter Comes to the Forest
F330	Leaves
F477	Spring Is Here
F446	Summer Is Here
F448	Winter Is Here
F445	Fall Is Here
F89	Animals in Autumn
F90	Animals in Spring
F91	Animals in Summer
F92	Animals in Winter
F652	Winter: Story of Survival
F1073	Look Around You in Spring
F1074	Look Around you in Summer
F1075	Look Around you in Winter
F436	Summer is for Growing
F1446	Uncle Smiley Follows the Seasons

SLIDES

Signs of Fall
Signs of Spring
Signs of Summer
SL 164 (1-20) Signs of Winter

OTHER MATERIALS

Weather and Seasons
Seasons and Living Things
Seasons Themes (study prints)

FILMSTRIPS

Winter and Seasons (MCG)
Nature in the Four Seasons (MES)
Trees and Flowers in the Four Seasons (EGH)
In the Autumn (MGH)
In the Winter (MGH)
In the Spring (MGH)
In the Summer (MGH)
Autumn Is Here (SVE)
Winter Is Here (SVE)
Summer Is Here (SVE)
Spring Is Here (SVE)
The Four Seasons (EB)
Animals in the Four Seasons (EGH)
Work in the Four Seasons (EGH)
Fall (CF)
Spring (CF)
Summer (CF)
Winter (CF)
The Four Seasons (MH)
The Seasons (EB)

PA12 Describe the life cycles of some familiar plants.

UNIT TOPIC: Plant Life

ESTIMATED DURATION
3-4 weeks

Vocabulary

seed
sprout
tree
bulb
cutting
runner

Subobjectives/Activities

Subobjectives:

A. Observe and identify various kinds of seeds and match them to the parent plants.
B. Observe different seeds growing.
C. Describe the life cycles of several familar plants (seed sprout, tree, seed).
D. Observe and describe the growth of plants from seeds, runners, cuttings, and bulbs.

Activities

1. Go on a field trip and collect seeds from various plants. Be sure to label them.
2. Identify seeds you can eat.
3. Open several kinds of seeds to see what is inside.
4. Try to grow different kinds of seeds collected from your field trip.
5. Put pictures of the life cycles of familiar plants into sequence (tree, bean plant, etc.).
6. Try to grow a variety of plants from seeds, runners, cuttings and bulbs.
7. Identify means of seed dispersal.

Materials

TEXTBOOKS

Accent on Science,
Level 3, Unit 1

STEM, Level 2, Unit 2

S.F. Science, Level 1, Unit 7

CAPTIONED FILMS

F579	What Do Seeds Do?
F220	Rice from Seed to Flower
F446	Summer Is Here

BOOKS

Manley, Deborah,
Let's Grow Things

OTHER MATERIALS

A Look at Plants (National Geographic Kit)
Seeds and Their Travels (flannel board)
Our Science Table (duplicating masters)
SAVI Science Kit: Structures of Life

PA13 Identify parts of plants and describe their functions.

UNIT TOPIC: Parts of Plants and Their Functions

ESTIMATED DURATION
2-3 weeks

Vocabulary

roots
stems
leaves
flowers
cones
simple leaf
compound leaf
function

Subobjectives/Activities

Subobjectives:

A. Identify roots, stems, leaves, and flowers of seed plants.
B. Describe two main functions of roots.
C. Differentiate between basic types of roots.
D. Identify and describe different types of stems and their functions.
E. Identify the functions of leaves.
F. Differentiate between needlelike and broad, flat leaves.
G. Differentiate between simple and compound leaves.
H. Describe the functions of flowers and cones.

Activities

1. Label the parts of a plant.

2. Match plant parts to their functions.

3. Role-play the functions of each part of a plant.

4. Make a leaf book. Identify the tree each leaf comes from. Label each leaf as single or compound.

5. Start a collection of dried flowers. Identify the plant each flower comes from.

6. Start a collection of cones. Identify the plant that each cone comes from.

Materials

TEXTBOOKS

Accent on Science,
Level 3, Unit 1

S.F. Science, Level 1, Unit 7

CAPTIONED FILMS

F578 What Do Flowers Do?
F579 What Do Seeds Do?

OTHER MATERIALS

A Look at Plants (National Geographic Kit)
Understanding Plants (duplicating masters)
Our Science Table (duplicating masters)

F02 Describe work in terms of pushes and pulls.

UNIT TOPIC: Doing Work

ESTIMATED DURATION
2-3 days

Vocabulary

work
push
pull
easy
hard
difficult
force

Subobjectives/Activities

Subobjectives

A. Define work as a push or a pull.
B. Identify and compare jobs as easy or difficult in terms of the energy expended.
C. Classify situations where work is or is not being done.
D. Identify ways to make work easier.

Activities

1. Identify and classify things you push or pull.
2. Classify objects as requiring more or less force (energy).
3. Define work as moving something. Then classify situations where work is and is not being done.
4. List ways to make work easier. (using wheels, ramps, levers etc.)

Materials

TEXTBOOKS

Stem, Level 1, Unit 3

Accent on Science, Level 3, Unit 2

S.F. Science
Level 2, Unit 5

F03 Identify characteristics of objects in motion and at rest.

UNIT TOPIC: Objects in Motion

ESTIMATED DURATION
1 week

Vocabulary

near
far
curved
straight
spiral
slow
fast
toward
away
spinning
revolving
falling

Subobjectives/Activities

Subobjectives

A. Identify relative positions of objects in space (near, far).
B. Identify paths of motion (curved, straight, spiral, etc.).
C. Identify varying speeds of objects in motion (slow, fast, etc.).
D. Describe the movement of falling objects (gravity).
E. Predict where an object will land when it is dropped from a specific place.
F. Predict the direction, path, and speed of an object: toward, away, straight, curved, fast, slow, spinning, revolving, falling

Activities

1. Name things near and far away from a reference point.

2. Cut pictures from magazines showing photographs of objects near and far away from the camera.

3. Draw a picture according to directions telling what to draw near and far.

4. Roll balls differently to form different paths. Trace each path with chalk. Identify the motion of the ball: straight, curved, spiral, etc.

5. Have races using different objects. Identify fast and slow moving objects.

6. Compare the rate of speed of two objects falling from different heights; from the same height.

7. Make predictions about the paths, direction, and speed of an object, given information on specific variables.

Materials

TEXTBOOKS

Stem, Level 1, Units 1, 3

Science , Level 1
Unit 2, Clusters C-1, C-2
Unit 3, Cluster A-4

S.F. Science
Level 2, Unit 5

OTHER MATERIALS
Action Lab, Spinning Balance kit

F04 Identify and describe three simple machines.

UNIT TOPIC: Simple Machines

ESTIMATED DURATION
1-2 weeks

Vocabulary

lever
wheel/axle
inclined plane
simple machine
screwdriver
see-saw
scissors
ramps
stairs

Subobjectives/Activities

Subobjectives

A. Identify levers used in familiar implements.
B. Demonstrate how levers make work easier.
C. Identify wheels used in familiar implements.
D. Demonstrate how wheels make work easier.
E. Identify inclined planes in familiar implements and places.
F. Demonstrate how inclined planes make work easier.
G. Classify simple machines as levers, wheels, or inclined planes.

Activities

1. Make a lever box, a wheel and axle box, and an inclined plane box. Collect machines to put in each.
2. Demonstrate how a stick can be used as a lever.
3. Predict which will be easier in terms of energy expended:
   a. Opening a can with a can opener.
   b. With a can opener attached to the end of a ruler.
   c. With a can opener attached to the end of a yardstick. Now try it!
4. Predict which will be easier:
   a. Pulling a box across the floor.
   b. Pulling a box sitting on dowels across the floor.
5. Use a spring scale to show how inclined planes make work easier.
6. Look at drawings of simple machines: screwdriver, stick, doorknob, road, stairs, ramp, scissors, see-saw. Classify them as levers, wheels & axles, or inclined planes.

Materials

TEXTBOOKS

Science, Level 5, Unit 3, Clusters C-2, C-3

Accent on Science, Level 3, Unit 2

S.F. Science, Level 4, Unit 6

Stem, Level 1, Unit 3

CAPTIONED FILMS:
F567 Simple Machines at Sea
F161 Machines Do the Work

FILMSTRIPS:
Inclined Planes (JH)
Levers at Work (JH)
Wheels and Axles at Work (JH)
Wheels Make Our Work Easier (VE)

OTHER MATERIALS
Readiness in Science
(duplicating masters)

FIELD TRIPS
Children's Museum: Simple Machines
Industrial Museum

F05 Identify some common machines and their uses in daily living.

UNIT TOPIC: Machines

ESTIMATED DURATION
2-3 days

Vocabulary	**Subobjectives/Activities**	**Materials**
machine names of common machines work	Subobjectives A. Classify objects as machines or non-machines. B. Identify common machines at home, school, and on the job. C. Match machines to kinds of work performed.	**TEXTBOOKS** *Stem*, Level 1, Unit 3
	Activities 1. Cut out pictures of machines shown in magazines.	S.F. *Science*, Level 2, Unit 5
	2. Define a machine as anything that helps people work. Ask students to name common machines in the classroom: spoons, scissors, doorknobs, and other simple machines.	*Accent on Science* Level 3, Unit 2
	3. Match pictures of common household machines to the rooms in which they are used.	**FILMSTRIPS:** Machines and Tools Help Us Work (SVE) Machines Make Work Easier (VE) Machines: What Do They Do? (MDC)
	4. Match pictures of machines to the work they perform.	Machines (EB)

PM05 Observe and identify the different states of matter.

UNIT TOPIC: **Solids, Liquids, and Gases**

ESTIMATED DURATION
3-4 weeks

Vocabulary

- ice
- water
- steam
- solid
- liquid
- gas
- air
- change
- matter

Subobjectives/Activities

Subobjectives

A. Investigate water in its three states.
B. Identify some properties of solids.
C. Identify some properties of liquids.
D. Identify some properties of gases (air).
E. Observe physical and chemical changes in states of matter.

Activities

1. Experiment to show how water changes state. Predict what will happen before doing experiments.
2. Demonstrate that solids have their own shape, weight, color, size, and texture.
3. Demonstrate how liquids take the shape of their containers and have weight, color, and size.
4. Classify objects as solids or liquids.
5. Compare mystery liquids. Try to identify each liquid based on its properties. (Do not allow students to taste the mystery liquids)
6. Experiment to demonstrate where air is. (See Jam Handy filmstrips for experiments.)

   Examples:
   a. Wave a book or fan at a student. Note how the air moves.
   b. Hold your breath to show people need air to breathe.

Materials

TEXTBOOKS

Stem, Level 1, Unit 4

Science, Level 2, Unit 1

Accent on Science
Level 3, Unit 3

S.F. Science,
Level 1, Unit 3

ESS, "Ice Cubes,"
"Drops, Streams, and Containers"

CAPTIONED FILMS

F1070	Learning About Liquids, Solids, and Gases
F146	Introducing Air
F797	The Ocean of Air

FILMSTRIPS

Finding Out About Heating Solids, Liquids, and Gases (SVE)
Nothing But Air (EB)
The Air (EB)
The Story of Air (EB)

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c. Catch air in a plastic bag.
d. Trap air under water in an upside-down cup. Let some air out in the form of bubbles.
e. Get a shoe box with a lid. Cut a hole in one end. Cover the outside of the hole with tissue paper. Ask students what is in the box, then squeeze the box to show how the air moves the tissue paper. Ask students what moved the tissue.

7. Demonstrate that gases take the shape of their containers, and have color, smell, weight, and size.

FILMSTRIPS (continued)

Air Helps Things Float in Water (JH)
A0-49 Air Is Everywhere (JH)
A0-47 Air Is Real (JH)
A0-50 Air Pushes Against Things (JH)
CQ-27 Air Works For Man (JH)

OTHER MATERIALS
Readiness In Science
(duplicating masters)
Action Lab, Waterspout kit

PM06 Identify the charactertistics of the states of matter.

UNIT TOPIC: Describing States of Matter

ESTIMATED DURATION
2 weeks

Vocabulary

solid
liquid
gases
change
matter

Subobjectives/Activities

Subobjectives

A. Describe the characteristics of each state of matter.
B. Classify substances according to their state of matter.
C. Explain how substances can change states.

Activities

1. List the characteristics of each state of matter. Tell how they are alike and how they differ.

2. Classify substances according to their state of matter: solid, liquid or gas.

3. Demonstrate how substances can change shape.

    a. Make Jello.
    b. Make a cloud.
    c. Boil water.
    d. Evaporate water.
    e. Burn a candle.

4. Make a weird substance that is part solid and part liquid.

    Mix: 1 (1 lb) box of starch with 12 oz. of water (355 ml.) in a large bowl. Add food coloring and cologne.

    Divide the substance so each student can observe its properties. Decide whether it is a solid or a liquid, based on its properties. Store in an air-tight container.

Materials

TEXTBOOKS
Science, Level 4,
Unit 2, Cluster A-2

Stem, Level 1, Unit 4

Accent on Science
Level 3, Unit 2

S.F. SCIENCE, Level 2, Unit 3

ESS, "Ice Cubes"
"Gases and Airs"

BOOKS
Branley, F., Air Is All Around You
Brown, Sam, Bubbles, Rainbows, & Worms

CAPTIONED FILMS
F1070 Learning About Liquids, Solids, and Gases

FILMSTRIPS
Nothing But Air (EB)
The Air (EB)
Air Is Everywhere (JH)
Air Pushes Against Things (JH)
Finding Out About Heating Solids, Liquids, and Gases (SVE)

E03 Identify the characteristics of heat energy.

UNIT TOPIC: Exploring Heat Energy

ESTIMATED DURATION
2 weeks

Vocabulary

- temperature
- metric
- thermometer
- freezing
- boiling
- conductors
- insulators
- conserve
- heat energy
- expand
- contract

Subobjectives/Activities

Subobjectives:

A. Measure temperature using metric thermometers.
B. Identify freezing and boiling points of water.
C. Identify heat conductors and insulators.
D. Identify ways to conserve heat energy.
E. Identify variables in a heat energy system (color, amount, size).
F. Describe how objects expand and contract in response to heat or cold.

Activities:

1. Measure the temperature of various liquids using a Celsius thermometer.
2. Measure body temperatures with Celsius and Fahrenheit thermometers.
3. Find the freezing and boiling points of liquids using Celsius and Fahrenheit thermometers.
4. Make your own thermometer.
5. Write a report on ways to conserve heat energy.
6. Experiment to show how a balloon expands when it is heated and contracts when it is cooled.

Materials

TEXTBOOKS

STEM, Level 3, Unit 7

Science, Level 4,
Unit 4, Clusters B-1, B-2

S.F. Science, Level 5, Unit 4

Accent on Science, Level 3,
Unit 3, Chapter 3

CAPTIONED FILMS

F1567 Studying Heat, Its Behavior
F688 Heat for Beginners

FILMSTRIPS

Light, Heat, and Sound (JH)
Heat Makes Things Expand (JH)
Heat Travels (JH)
Distributing Heat Energy (EB)
Where Do We Get Heat (JH)
What Is Heat? (JH)
Heat Changes Things (JH)
Thermometer (JH)
Cause and Nature of Heat (JH)
How Heat Causes Expansion (JH)
How Heat Travels (JH)
Exploring Cold (VE)

7. Attach balloon to a small-mouth pyrex container or flask. Place in a pan of boiling water. What happens to the balloon?

   Now put the container with expanded balloon in a pail of ice. What happens to the balloon? Observe and record your observations.

BOOKS

Stone, Harris, The Heat's On
Balestrino, Phillip, Hot As an Ice Cube
Feravolo, Rocco, Jr. Science Book of Heat
Parker, Bertha M., Thermometers, Heat, and Cold

OTHER MATERIALS

Energy and Matter (study prints)
Heat, Light, and Sound (duplicating masters)
SAVI Science Kit: Measurement

C03 Investigate water in the air.

UNIT TOPIC: Water in the Air

ESTIMATED DURATION
2 weeks

Vocabulary

evaporation
condensation
water vapor
water cycle
moist
relative
humidity
dew point
frost
fog
cirrus
stratus

Subobjectives/Activities

Subobjectives

A. Describe the water cycle in terms of evaporation, condensation, and water vapor.
B. Identify factors that affect the rate of evaporation.
C. Demonstrate that evaporation cools an object, while condensation warms it.
D. Identify sources of water vapor.
E. Explain why moist air is lighter than dry air.
F. Define and measure relative humidity.
G. Define dew point and find the dew point of an area.
H. Explain how frost is formed.
I. Explain how clouds are formed.
J. Explain why it rains.
K. Describe ways in which fog can form at ground level.

Activities

1. Experiment: Predict how fast water will evaporate from a container. Measure the water daily. Make a chart.

2. Experiment: Select three containers and put two cups of water in each. The containers should have different size openings (a shallow pan, a jar, a narrow-neck bottle). Predict the container that will evaporate the fastest, the slowest. Measure the water daily. Record on a chart.

3. Experiment: Find out how heat and cold affect the rate of evaporation. Put the same amount of water in two identical containers. Put one in the sunlight and the other in the shade. Measure the amount of water in each daily. Is there a difference?

Materials

TEXTBOOKS
Accent on Science
Level 3, Unit 4
Level 5, Unit 3

Stem, Level 6
Unit 6

Science, Level 6
Unit 3, Cluster C-1;
Level 4, Unit 3, Clusters C-1, C-2;
Level 5, Unit 3

S.F. Science, Level 3, Unit 6
Chapter 11;
Level 4, Unit 2, Chapter 3

BOOKS
Franklyn, B., Rain and Hail

CAPTIONED FILM
KSF-67 The Water Cycle

4. Experiment: Put a spoonful of water on each of three paper towels placed on plates. Put one plate near a sunny window, put another in a shaded spot, and put the third in a plastic bag secured with a tie. Predict which plate will evaporate the fastest.

FILMSTRIPS

Finding Out About Clouds (SVE)
Let's Look at the Weather (WD)
Rain, Hail, and Sunshine (TA)
Water in the Air (EB)

OTHER MATERIALS

Study Prints
- Water
- Air and Weather
- (1-14) Simple Science

Duplicating Masters
- Understanding Weather
- Air and Water
- Weather Science

C04 Identify and describe the sources of fresh water on the earth

UNIT TOPIC: **Water on Earth**

ESTIMATED DURATION
3-5 days

Vocabulary

runoff
groundwater
reservoirs
ocean
river
lake
stream
pond

Subobjectives/Activities

Subobjectives

A. Describe what happens to runoff.
B. Describe what happens to groundwater.
C. Identify places on earth where water is stored (glaciers, oceans, lakes, ponds, etc.).

Activities

1. Discuss how people get water for daily living.

2. Discuss the role of gravity in runoff.

3. Discuss why people need wells.

4. Identify ways to conserve water.

5. Write a story about a drop of water. Tell what happens to it.

Materials

TEXTBOOKS

Accent on Science, Level 3, Unit 4

PA14 Identify and describe food chains and food webs, and the process of decompostion.

UNIT TOPIC: Food Chains and Food Webs

ESTIMATED DURATION
2-3 weeks

Vocabulary

sun
decomposer
food chain
food web
energy

Subobjectives/Activities

Subobjectives:

A. Identify plant eaters and animal eaters.
B. Identify predators and prey; consumers and producers.
C. Identify the sun as the beginning of all food chains and decomposers as the end of all food chains.
D. Describe energy transfer in a food chain.
E. Recognize that green plants make their own food, using the sun's energy.
F. Observe and describe the process of decompostion.
G. Construct food webs from several food chains.

Activities:

1. Draw arrows in a food chain to show the energy transfer: such as sun ---> corn ---> man

2. Research and report on how green plants make their own food using energy from the sun.

3. Draw 5-10 different food chains. Compare them with the food chains drawn by your classmates. Do all the food chains begin with the sun and end with decomposers?

4. Construct a food web from several food chains.

5. Bring in food that is beginning to mold. Predict how long it will take to decompose. Keep record of the changes.

6. Classify animals as plant eaters or animal eaters.

Materials

TEXTBOOKS

Science, Level 3

Accent on Science, Level 3

S.F. Science, Level 4

STEM, Level 5, Unit 9

CAPTIONED FILM

F833 Emily, The Story of a Mouse

OTHER MATERIALS

Life in a Pond (National Geographic Kit)

PA15 Investigate the factors or variables in several habitats that are suited to the special needs of a particular organism.

UNIT TOPIC: Habitats

ESTIMATED DURATION
2-3 weeks

Vocabulary

environment
habitat
arctic
saltwater
freshwater
forest
jungle
temperature
niche
water
sunlight
food
factor

Subobjectives/Activities

Subobjectives:

A. Define environment/habitat/niche.
B. Identify the factors in a variety of environments that make them suitable for specific animals: desert, jungle, arctic, saltwater, etc.
C. Identify environmental factors required by specific types of plants: temperature, amount of water, amount of sunlight, etc.

Activities:

1. List environmental factors necessary for specific animals; e.g., earthworm: darkness, water, warmth, etc.

2. Supply each student with a cutout of an organism. Have students paste their cutouts on paper, then draw in the most appropriate environment or habitat for that organism, and write a brief paragraph to describe it.

3. Grow one variety of plant in different environments. Provide different temperatures and amounts of water, soil, and sunlight. Observe and keep records to determine the best environment for that kind of plant.

Materials

TEXTBOOKS

Accent on Science,
Level 3, Unit 5

CAPTIONED FILMS

F591	African Animals: Hoof and Horn
F1106	Animals of Australia
F778	Forest Fisherman: Story of an Otter
F189	Animal Habitats
F786	Land of Friendly Animals
F799	Penguins of the Antarctic
F902	Ecosystems: The Aquatic Environment
F963	A Visit to a Pond
F857	The Stream
F664	An Aquarium in Action
F738	The Coral Jungle
MF31	Cry of the March

FILMSTRIPS

Desert (EGH)
Tropical Rain Forest (F.S.4) (EGH)
Tropical Rain Forest (F.S.5) (EGH)
Mid-Latitude Grasslands (EGH)
The Desert: An Example of Adaptation (EB)
Habitat (EB)
Plant Life in the Desert (EB)

G02 Identify layers of soil; investigate rocks formed of layers.

UNIT TOPIC: Layers of Soil and Rocks

ESTIMATED DURATION
1 week

Vocabulary

soil
rock
layers
topsoil
bedrock
oldest
youngest
formation
sedimentary
settles
rough
hard
sediment
river
deposit
subsoil

Subobjective/Activities

Subobjectives:

A. Identify layers of soil: topsoil, subsoil, bedrock.
B. Identify the oldest and youngest of several layers.
C. Explain the formation of sedimentary rock.
D. Identify some characteristics of sedimentary rock.

Activities

1. Take a core sample of soil. Identify topsoil and subsoil. Try to dig down to bedrock.

2. Take a field trip to look at cuts made in the earth for roads or other construction. Try to identify topsoil, subsoil, and bedrock.

3. Identify the oldest and youngest of several layers of rock brought to class or observed on a field trip.

4. Research and report on the formation of sedimentary rock.

5. Visit a river area to look at sedimentary deposits.

6. Make a checklist of characteristics of sedimentary deposits: layered, rough, hard, sandy.

7. Start a collection of sedimentary rocks. Bring in samples and identify them as sedimentary using the checklist for #6, or compare them to illustrations of samples of rock.

8. Experiment: Test sedimentary rocks for limestone. Drops of vinegar bubble on limestone, but not on other rocks.

Materials

TEXTBOOKS
Science, Level 4, Unit 2,
Clusters B1, B2

STEM, Level 5, Unit 5

Accent on Science, Level 3,
Unit 6, Chapter 1, 2

S.F. Science, Level 3,
Unit 4, Chapters 7, 8

CAPTIONED FILMS
F1094 Understanding Our Earth: Rocks and Minerals

BOOKS
Zim, Herbert, What's Inside the Earth?
Gans, Roma, The Wonder of Stones
Podendorf, Illa, True Book of Rocks and Minerals
Bartlett, Margaret, Rocks All Around Us
Cartwright, Sally, Sand

G03 Identify rocks and minerals according to their characteristics and formation.

UNIT TOPIC: Kinds of Rocks

ESTIMATED DURATION
1-2 weeks

Vocabulary

sedimentary
igneous
metamorphic
mineral

Subobjective/Activities

Subobjectives:

A. Identify sedimentary rocks and explain how they form.
B. Identify igneous rocks and explain how they form.
C. Identify metamorphic rocks and explain how they form.
D. Classify rocks as sedimentary, igneous, or metamorphic.

Activities

1. Research the three kinds of rocks. List characteristics and examples of each kind. Explain how each is formed.

2. Make a rock chart. List examples, characteristics, and formation of each of the three kinds of rocks.

3. Identify and describe the minerals found in different kinds of rocks.

4. Start a rock collection. Classify rocks as sedimentary, igneous, or metamorphic. Identify samples using illustrations from a rock identification book.

5. Visit a museum exhibit of rocks and minerals.

OTHER MATERIALS
Earth Science (duplicating masters)
Geology: Many Kinds of Rocks (filmstrip--EG)

FIELD TRIPS
Natural History Museum
Maryland Science Center
Road or building construction site

Materials

TEXTBOOKS
Science, Level 4,
Unit 2, Cluster B-2

STEM, Level 5, Unit 5

Accent on Science, Unit 4

S.F. Science, Level 4,
Unit 4, Chapter 7

CAPTIONED FILM
1094 Understanding Our Earth:
Rocks and Minerals

BOOKS
Zim, Herbert, What's Inside the Earth?
--- Rocks and Minerals
Gans, Roma, The Wonder of Stones
--- Rock Collecting
Gallob, Edward, City Rocks, City Blocks, and the Moon
Gilbert, Miriam, Science/Hobby Book of Rocks and Minerals
Shuttlesworth, Dorothy, Story of Rocks
Bartlett, Margaret, Rocks All Around
Crosby, Phoebe, Junior Science Book of Rock Collecting

OTHER MATERIALS
Earth Science (duplicating masters)
Geology: Many Kinds of Rocks (EG) (filmstrip)

A04 Describe day and night in terms of the earth's movements.

UNIT TOPIC: Day and Night

ESTIMATED DURATION
1 week

Vocabulary

day
sunset
sunrise
revolve
rotate

Subobjectives/Activities

Subobjectives

A. Observe and describe sunrise, sunset, and the apparent movement of the sun across the sky.
B. Demonstrate day and night in terms of the movement of the earth.
C. Explain the length of day and night in terms of the movement of the earth, turning once every 24 hours.
D. Predict where it is day and night in relation to the earth's movements.

Activities

1. Using a globe of the earth and a flashlight, demonstrate the movement of the earth that causes day and night. Students should identify countries having day and night.

2. Using the globe of earth, have students explain why the sun rises in the east and sets in the west.

3. Compare time zones around the earth.

4. Infer whether it is morning, noon, afternoon, or night in a country based on the movement of the earth in relation to the sun.

Materials

TEXTBOOKS
Stem, Level 3, Unit 5

Science, Level 5, Unit 3, Cluster A-3

Accent on Science, Level 3, Unit 7

S.F. Science, Level 2, Unit 6, Chapter 11

CAPTIONED FILM
F569 Sun

FILMSTRIPS
Finding Out About Day and Night (SVE)
The Night Sky (EB)
Day and Night (CF)
Our Home, The Earth (SVE)
Learning About Rotation (MGH)
Why do we have Night and Day? (PH)

BOOKS
Wonder Books, Sun

A05 Describe the characteristics and motion of the moon.

UNIT TOPIC: The Moon

ESTIMATED DURATION
2 weeks (1-month experiment)

Vocabulary

- moon
- moonlight
- reflected light
- phases
- new moon
- full moon
- crescent moon
- half moon
- waxing
- waning
- last quarter
- first quarter
- lunar eclipse
- gibbous moon

Subobjectives/Activities

Subobjectives

A. Identify moonlight as reflected light.
B. Observe and record the apparent shape of the moon.
C. Demonstrate what causes apparent changes in the shape of the moon.
D. Describe the surface of the moon and human flight to the moon.
E. Relate the use of a monthly calendar to the phases of the moon.

Activities

1. Look at the moon every night. Record its shape on a calendar. Predict the shape of the moon at a given time based on the calendar record.
2. Research and report on human lunar exploration.
3. Demonstrate how the moon revolves around the earth. Relate the monn's movements to its phases.
4. Describe what happens during a lunar eclipse.

Materials

TEXTBOOKS

STEM, Level 3, Unit 5
Level 5, Unit 8

Accent on Science, Level 3, Unit 7

Science, Level 4, Unit 3, Cluster A-3

S.F. Science, Level 2, Unit 6, Chapter 12

ESS, "Where Is the Moon?"

FILMSTRIPS

The Moon (EB)
Astronomy Through the Ages (EB)
The Night Sky (EB)
Moon Rocks (HMS)
Phases of the Moon (PH)

A05 Describe the characteristics and motion of the moon.

BOOKS

Langseth, M. & L., Apollo Moon Rocks
Branley, F., What Is the Moon Like?
Shapp, Martha, Let's Find Out About the Moon
Hawkins, Gerald, The Moon Tonight
Stein, Conrad, Story of Apollo 11
Greene, Carol, Astronauts

OTHER MATERIALS

Study Prints:
Moon and Stars
Earth, Sun, and Stars (duplicating masters)
The Earth's Moon (Nat'l Geo Kit)
Or write to: Young Astronauts Council
1211 Connecticut Ave., NW
Washington, DC 20036

FIELD TRIPS

Museum of Natural History
Air and Space Museum

HGR03 Identify and compare male and female external characteristics.

UNIT TOPIC: Males and Females—Alike and Different

ESTIMATED DURATION
1-2 weeks

Vocabulary

- male
- female
- alike
- different
- penis
- pubic hair
- testicles
- buttock
- private body parts
- breasts

Subobjectives/Activities

Subobjectives:

A. Identify humans as male or female.
B. Investigate how males and females are similar and different.
C. Classify external characteristics as male or female.

Activities

1. Make a chart of male/female similarities and differences. Have student name characteristics to put on the chart.

2. Cut pictures of males and females out of magazines. Make "male" and "female" collages.

3. Classify different kinds of touching as appropriate or inappropriate.

4. Identify appropriate and inappropriate times and places to discuss private body parts and their functions.

Materials

CAPTIONED FILM
F667 Boys and Girls: Alike and Different

OTHER MATERIALS
See librarian for special collection.

INTERMEDIATE UNIT TOPICS--BY SUBJECT AREAS

PHYSICAL SCIENCE

Properties of Matter (PM)
Intro to the Metric System
Changes in State of Matter
Properties of Matter
Introduction to Compounds

Energy (E)
Exploring Light Energy
Properties of Sound
Exploring Electric Energy
Forms of Energy
Energy Transmission & Transformation
Conserving Energy

Force, Work, & Motion (FWM)
Investigating Magnets
Investigating Forces
Friction
Measuring Forces
Investigating Simple Machines

EARTH SCIENCE

Geology (G)
Oceans
Air Affects Weather
Forecasting the Weather

Astronomy (A)
Our Solar System
Reasons for Seasons
Stars
Exploring Space

Geology (G)
Minerals
Uses of Rocks & Minerals
Fossils
Sudden Changes in Land
Erosion & Weathering

LIFE SCIENCE

Plants and Animals (PA)
Life Cycles of Animals
Adaptations
Life Cycles of Plants
Uses of Plants
Vertebrates
Invertebrates
Grouping Plants
Introduction to Protists
Ecosystems
Communities of Living Things
Conserving Our Environment

Human Growth & Reproduction (HGR)
Cells to Systems
The Eye & Vision
Body Systems I
Body Systems II
Stages of Development
Reproduction

Health, Safety, Nutrition (HSN)
Four Basic Food Groups
Essential Elements of Growth
Dangerous Situations
Basic First Aid
Drugs
Diseases and Their Treatments

Sound & Hearing (S)
Properties of Sound
The Ear
Measuring Hearing Loss
Being Hearing Impaired

INTERMEDIATE OBJECTIVES—SUGGESTED SEQUENCE

Fourth Year		Fifth Year		Sixth Year	
HGR04	Cells to Systems	PA20	Vertebrates	PA23	Introduction to Protists
		PA21	Invertebrates		
HSN04	Four Basic Food Groups			HSN09	Diseases and Treatment
HSN05	Essential Elements of Growth	PM07	Intro to Metric System		
		PM08	Changes/States of Matter	PM09	Properties of Matter
HSN06	Dangerous Situations			PM10	Introduction to Compounds
HSN07	Basic First Aid	C06	Air Affects Weather		
		C07	Forecasting Weather	E09	Conserving Energy
E04	Exploring Light Energy				
		A07	Reasons for Seasons	HGR07	Body Systems II
HGR05	The Eye & Vision				
		HGR06	Body Systems I	A09	Exploring Space
A06	Our Solar System				
		HSN08	Drugs	PA24	Ecosystems
G04	Minerals			PA25	Communities of Living Things
G05	Uses of Rocks & Minerals	F07	Investigating Forces		
G06	Fossils	F08	Friction	HGR08	Stages of Development
		F09	Measuring Forces	HGR09	Reproduction
PA16	Life Cycles of Animals	F10	Investigating Simple Machines		
PA17	Adaptations			PA26	Conserving Our Environment
S04	Properties of Sound (E05)	A08	Stars		
S05	The Ear				
S06	Measuring Hearing Loss	E07	Forms of Energy		
S07	Being Hearing Impaired	E08	Energy Transmission & Transformation	HGR16	*Reproductive System
				HGR17	*Pregnancy
C05	Oceans				
		G07	Sudden Changes in the Land	HSN10	*Nutrition
F06	Investigating Magnets	G08	Erosion & Weathering	HSN11	*Diseases & Their Prevention
				HSN12	*Substance Abuse
E06	Exploring Electric Energy	PA22	Grouping Plants		
				S09	*Deafness & Communication
PA18	Life Cycles of Plants			S10	*New Ways to Help the Hearing Impaired
PA19	Uses of Plants				

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*To be completed only by students for whom sixth grade will be their final year in school.

HGR04 Identify cells, tissues, organs, systems (overview).

UNIT TOPIC: Cells to Systems

ESTIMATED DURATION
1-2 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
cell tissue organ system	Subobjectives: A. Describe cells as the basic building blocks of the human body. B. Describe tissues as cells working together as a group. C. Identify some organs in the human body: heart, lungs, kidneys, stomach, intestines, bladder, brain, eye, etc. D. Identify some organs of the human body and describe their main functions. Activities 1. Observe different kinds of cells under a microscope. 2. Locate and label organs on a diagram of the human body. 3. Observe x-rays of different parts of the skeletal system. 4. Demonstrate how to feel a muscle by pulling against the elbow or the knee. 5. Discuss the correct way of lifting heavy objects to avoid injury to the muscles. 6. Have students eat crackers and describe their observations of what happens to the food in their mouths. 7. Trace the path of food through the body.	**TEXTBOOKS** Accent on Science, Level 4, Unit 1 **CAPTIONED FILM** F391 About the Human Body **OTHER MATERIALS** 000-726 Systems of the Human Body (duplicating masters) SP 384 The Human Body (1-10) (study prints)

HGR04 Identify cells, tissues, organs, systems (overview continued).

8. To prove that people exhale carbon dioxide, have a student breathe deeply, then exhale into a glass of fresh limewater. Repeat this process several times. The water will begin to appear milky because of the carbon dioxide.
(To make limewater, buy calcium hydroxide from a drug store and mix about 3 teaspoonfuls into a glass of water.)

9. Discuss how smoking can harm the respiratory system.

10. Invite a nurse or paramedic to class to demonstrate current methods of artificial respiration.

HSN04 Identify foods in the four basic food groups and the needs they satisfy.

UNIT TOPIC: Four Basic Food Groups

ESTIMATED DURATION
2 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
basic food groups meat dairy names of foods fruits vegetables cereals grains	Subobjectives A. Identify the four basic food groups. B. Classify foods according to food groups. C. Identify quantities of food from each group that should be eaten daily. Activities 1. Cut pictures from magazines and make collages showing the four basic food groups. 2. Keep a record of what you eat for one or two weeks. Identify foods from the four basic food groups. Is your diet adequate? 3. Discuss what happens to people who eat too much food.	**CAPTIONED FILMS** KSF Foods and Nutrition F743 What's Good to Eat? **FILMSTRIP** You and Your Food (WD) **OTHER MATERIALS** Nutrition (study print) Nutrition Action Pack (McDonald's) Nutrition: Food the Body Needs (National Geographic)

HSN05 Identify how foods and their elements help the body grow.

UNIT TOPIC: Essential Elements for Growth

ESTIMATED DURATION
2 weeks

Vocabulary

vitamins
minerals
protein
diet
fat
water
carbohydrates

Subobjectives/Activities

Subobjectives

A. Identify how each of the four basic food groups helps the body grow.
B. Identify important food elements and how they help the body.
C. Identify foods high in substances necessary for growth and development.
D. Identify foods high in fat and sugar, and give reasons for limiting their intake.

Activities

1. List the vitamins and show how they help the body.
2. Make a chart showing foods, their elements and sources, and how they help people grow.
3. Make collages showing foods high in substances necessary for growth and development.
4. Make collages showing foods high in fat, sugar, protein, and carbohydrates.

Materials

TEXTBOOKS
S.F. Science, Level 3, Unit 1

Accent on Science
Level 4, Unit 1

FILMSTRIPS
Finding Out How Foods Are Used (SVE)
You and Your Food (WD)

BOOK
LeMaster, Leslie J., Nutrition

HSN06 Decribe dangerous situations and identify what to do in each situation.

UNIT TOPIC: Dangerous Situations

ESTIMATED DURATION
1-2 weeks

Vocabulary

dangerous situation

Subobjectives/Activities

Subobjectives:

Describe dangerous situations involving the following factors and explain what to do in each situation.

A. Fire
B. Electricity
C. Tools (hand tools and power tools)
D. Bike riding and walking in the street.
E. Strangers
F. Poisons and substances that might be poisonous
G. Strange animals

Activities

1. Write essays on various dangerous situation and how to handle them. Collect them to make a book about safety.

2. View movies and filmstrips about dangerous situations.

3. Put on plays that demonstrate safe behavior in a variety of situations.

Materials

CAPTIONED FILMS

F377	Safety ... Walk to School
F770	Electricity--Handle With Care!
F775	Fire--Not in My House
F612	Fire--Two Ways Out
FS142	Fool With Fire
F615	Hitchhiking
F426	Sniffy Escapes Poisoning
F768	Danger--Poison
F994	Safety in Transit
F623	Ice Safety
F345	Kitchen Safety
F398	Safety in the Home
F468	Safe in the City Streets

OTHER MATERIALS

Jiminy Cricket's "I'm No Fool with Safety"

HSN07 Decribe basic first aid procedures for a variety of emergencies.

UNIT TOPIC: Basic First Aid

ESTIMATED DURATION
2-3 weeks

Vocabulary

first aid
cut
abrasion
burn
broken bones
faint
shock
choke
drown
treatment

Subobjectives/Activities

Subobjectives:

Identify and demonstrate basic first aid procedures for the following emergencies.

A. Cuts and abrasions
B. Burns
C. Broken bones
D. Fainting and shock
E. Choking victims
F. Drowning victims

Activities

1. Ask the Red Cross or another health organization to offer an after-school course in first aid.

2. Make a first aid book for your school.

Materials

BOOK
Basic First Aid Book, Kit

CAPTIONED FILMS

F844	How to Save a Choking Victim
F4644	Drownproofing
F465	Artificial Respiration
KSF106	Save That Life

OTHER MATERIALS
First Aid books and information from the American Red Cross
Choking (poster)
Contact the Red Cross, local police, fire department, and public hospital for more information.

E04 Identify the characteristics of light energy.

UNIT TOPIC: Exploring Light Energy

ESTIMATED DURATION
2-3 weeks

Vocabulary

light
opaque
translucent
transparent
material
shadow
object
light source
refraction
lens
prism
natural
artificial
rainbow
convex
concave
mirror
reflect
absorb
optical illusion
magnifier

Subobjectives/Activities

Subobjectives:

A. Classify materials that conduct and absorb light (opaque, translucent, and transparent materials).
B. Identify objects by the shadows they produce.
C. Identify things needed to make a shadow (object, source of light).
D. Observe and define refraction.
E. Identify lenses and their uses.
F. Explain colors in relation to light energy.
G. Identify instruments used to measure light energy.
H. Differentiate between natural and artificial sources of light.
I. Describe the phenomenon of rainbows.

Activities:

1. Classify materials as opaque, translucent or transparent.
2. Demonstrate how to make a shadow.
3. Match shadows to the objects that produce them.
4. Observe length of shadows at various times during the day. Record observations, tell when they are longest, shortest.
5. Make a magnifier with a drop of water.
6. List the colors of the light spectrum. Demonstrate the use of a prism and discuss how it works.

Materials

TEXTBOOKS

Science, Level 3, Unit 3, Cluster C-3
Level 4, Unit 2, Clusters 1, 2

STEM, Level 3, Unit 4

Accent on Science, Level 4, Unit 2, Level 2, Chapter 6

S.F. Science, Level 3, Unit 2; Level 5, Unit 6

ESS: "Mirror Cards," "Optics," "Lights and Shadows"

CAPTIONED FILM
F1086 The Simple Lens: An Introduction

7. Cut out pictures of natural and artificial forms of light energy, and make a poster.
8. Demonstrate the use of a light meter.
9. Practice taking pictures under different light conditions.
10. Experiment with optical illusions.

FILMSTRIPS

Light, Heat, Sound (JH)
Bouncing and Bending Light (FH)
Light (EB)
Shadows (WR)
The Sky Above Our Earth (SVE)
Finding Out About Light (SVE)

BOOKS

Paschel, H., First Book of Color
Branley, F., Light and Darkness
Schneider, Herman, Science Fun with a Flashlight
Bulla, C.R., What Makes a Shadow?
Feravolo, Rocco, Junior Science Book of Light
Carini, Edward, Take Another Look (optical illusions)

OTHER MATERIALS

Heat, Light and Sound (duplicating masters)
Action Lab, Turning Mirrors
Study Prints
 Energy and Matter
 Simple Science

FIELD TRIPS

Maryland Science Center: optical illusions, distorted rooms

E05 Identify the properties of sound energy. (See Objective S04 in Sound and Hearing.)

UNIT TOPIC: Properties of Sound

Vocabulary	Subobjectives/Activities	Materials
	(IMPORTANT! Use Objective S04 of Sound and Hearing.)	

HGR05 Identify the organ of sight and describe how people see.

UNIT TOPIC: The Eye and Vision

ESTIMATED DURATION
1 week

Vocabulary

sight
eye
iris
pupil
retina
optic nerve
nearsighted
farsighted
image

Subobjectives/Activities

Subobjectives:

A. Identify the parts of the eye.
B. Explain how people can see objects.
C. Observe how light affects the iris.
D. Explain the proper care of the eye.

Activities

1. Label the parts of the eye on a drawing.

2. Discuss the importance of the sense of sight.

3. Discuss aids for people with visual impairments: glasses, braille, canes, seeing-eye-dogs, recorded books, etc.

4. Have students observe changes in pupil size in dim and bright light.

5. Survey the colors of students' irises: graph the results.

6. Survey people who wear glasses. Find out whether they are nearsighted or farsighted.

7. Test the vision of students in class. Compare the results.

Materials

TEXTBOOK
Accent on Science,
Level 4, Unit 2

CAPTIONED FILMS
F895 How Much Are Your Eyes Worth?
F813 We'll See Tomorrow
F842 You and Your Eyes

FILMSTRIP
0-17 You and Your Eyes (EB)

BOOK
Sislowitz, Marcel, Look! How Your Eyes See

A06 Identify and describe the planets in our solar system.

UNIT TOPIC: Our Solar System

ESTIMATED DURATION
3-4 weeks

Vocabulary

planet
star
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto
gravity
atmosphere
moon

Subobjectives/Activities

Subobjectives:

A. Distinguish between planets and stars.
B. Identify the Earth as a planet.
C. Construct a scale model of the solar system.
D. Classify the planets of our solar system in terms of size, distance from the sun, temperature, weight, gravity, color, number of moons, atmoshpere, and the likelihood that life may be present.

Activities

1. Use styrofoam balls to build a scale model of our solar system.

2. Make a chart like the one below. Find information about each planet and complete the chart.

Planet Name	Distance from Sun	Weight	Color	Number of Moons	Temperature	Other

3. Write a report on one planet. Present it to the class. Put all the reports together to make a class book about the solar system.

Materials

TEXTBOOKS

STEM, Level 6, Unit 3

Accent on Science,
Level 4, Unit 3

Science, Level 3,
Unit 7, Chapter 19

CAPTIONED FILM
F661 The Age of Astronomy

FILMSTRIPS
The Solar System (EB)
Travel to the Outer Planets (HMS)
The Sky Above Our Earth (SVE)
Finding Out About Our
Solar System (SVE)
Planets and Comets (EB)
Our Earth (EB)

BOOKS
Branley, Franklyn,
A Book of Planets for You
The Planets in Our Solar System

OTHER MATERIALS
50 Facts About Space
Solar System (duplicating masters)
The Solar System (bulletin board)
The Earth's Place in Space
The Earth, Sun, and Stars
Solar System

G04 Identify some physical properties of minerals.

UNIT TOPIC: Minerals

ESTIMATED DURATION
1-2 weeks

Vocabulary	**Subobjective/Activities**	**Materials**
mineral property hardness luster crystal	Subobjectives: A. Describe some physical properties of minerals. B. Describe where minerals are found. C. Describe ways to identify minerals: tests for hardness, luster, streaks. D. Define crystals and explain how they grow. Activities: 1. Classify minerals according to their properties. 2. Grow and display several different kinds of crystals. 3. Start a class mineral collection.	**TEXTBOOK** Accent on Science, Level 4, Unit 4 **BOOKS** Crosby, Phoebe, Jr. Science Book of Rock Collecting Quick, Lelande, The Book of Agates Shuttlesworth, Dorothy, The Story of Rocks Zim, Herbert, Rocks and Minerals Gans, Roma, Millions and Millions of Crystals

G05 Identify uses of rocks, minerals, gems, and other natural resources, and how they are processed.

UNIT TOPIC: **Using Rocks, Minerals, and Other Natural Resources**

ESTIMATED DURATION
3 weeks

Vocabulary

ore
silver
copper
nickel
iron
lead
mercury
uranium
platinum
zinc
aluminum
gold
gem
gemstone
diamond
ruby
emerald
salt
marble
granite
talc
oil
coal
drilling
well
mine

Subobjectives/Activities

Subobjectives

A. Identify common ores and their uses. Explain how they are mined.
B. Identify common gemstones and their uses. Explain how they are mined.
C. Identify important rocks (salt marble, granite, talc, etc.) and their uses. Explain how they are mined.
D. Identify natural resources used for fuel; explain how they are mined.

Activities

1. Bring in samples of various metals and ores. Label them. Try to match each metal sample to its ore.

2. Research one type of metal and find out the ore from which it is made. Write a report on how it is mined and used.

3. Make a chart listing metals, the ore in which they are found, how they are mined, and how they are used.

4. Use a catalog from a jewelry store to identify gemstones.

5. Identify your own birthstone.

6. Research one gemstone in the library. Report on the stone, how it is mined, and how it is used.

Materials

TEXTBOOKS

STEM, Level 5, Unit 5

Science, Level 4,
Unit 2, Cluster B-2

S.F. *Science*, Level 1,
Unit 4, Chapter 7

CAPTIONED FILMS

F1053	Coal: The Rock that Burns
F1081	Oil: From Fossil to Flame
F260	How Plants Help Us

BOOKS

Telfer, Dorothy, *About Salt*
Vander Boom, Mae, *Miracle Salt*
Nixon, H., *Oil and Gas*
Goldin, Augusta, *Salt*
Gregory, O.B., *Oil*
Burt, Olive, *Black Sunshine*
Adler, Irving & Ruth, *Coal*
Zim, Herbert, *Diamonds*
Gunston, Bill, *Coal*
Potter, Neil, *Oil*

G05 Identify uses of rocks, minerals, gems, and other natural resources, and how they are processed (continued).

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7. Identify states where various ores and gemstones are found. Write to the department of natural resources of those to learn how the ores and gems are mined.

8. Research important rocks: salt marble, granite, talc, etc. Report on how they are mined and what they are used for.

9. Identify natural resources (coal and oil) used for fuel. Find out how they are retrieved from the earth.

10. Visit an oil refinery, coal mine, or museum to learn more about coal and oil.

11. On a large map of the U.S., illustrate the natural resources of each state. Make a map key showing the symbol for each resource.

OTHER MATERIALS
Energy from the Earth
(National Geographic kit)

FIELD TRIP
Natural history museum

G06 Identify fossils and explain how they are formed.

UNIT TOPIC: Fossils

ESTIMATED DURATION
1 week

Vocabulary

fossil

Subobjectives/Activities

Subobjectives

A. Classify fossils as formed from plants or animals.
B. Classify rocks that have fossils and those that do not.
C. Demonstrate how fossils form.
D. Identify places where fossils are likely to be found.

Activities

1. Observe different fossils or fossil illustrations. Classify them as plant or animal fossils.

2. Classify rocks as having or not having fossils. Dissuss similarities of rocks with fossils. Infer from this the kinds of rocks in which fossils usually form.

3. Experiment: Use mud or clay to make an impression of a shell, bone, leaf, or other natural object. Let the impression harden to form a "fossil." Have other students guess what made the fossil imprint.

4. Based on the kinds of rock in which fossils form, infer where fossils are likely to be found.

5. Visit a river bank, gravel pit, or other likely place to look for fossils.

6. Start a class fossil collection.

Materials

TEXTBOOKS

Science, Level 6,
Unit 3, Cluster B-2

STEM, Level 5, Unit 5

Accent on Science, Level 4, Unit 4

S.F. Science, Level 4,
Unit 5, Chapters 9 & 10

CAPTIONED FILMS

F662	The American Desert (fossils)
F1083	Prehistoric Animals of the Tar Pits

FILMSTRIPS

The Story Fossils Tell (EB)

BOOKS

Aliki, Fossils Long Ago

OTHER MATERIALS

Earth Science (duplicating masters)

FIELD TRIP

Natural history museum

PA16 Investigate the life cycles of animals.

UNIT TOPIC: Life Cycles of Animals

ESTIMATED DURATION
3-4 weeks

Vocabulary

migration
hibernation
courtship
reproduction
life cycle

Subobjectives/Activities

Subobjectives:

A. Investigate seasonal differences in animals.
B. Identify animals that migrate; explain the reasons for migration.
C. Identify different means of animal reproduction (cell division, regeneration, internal and external fertilization).
D. Investigate life cycles of various animals (beetle, mouse, butterfly, frog, etc.).

Activities:

1. List ways animals change with the seasons (body coloring, activity levels, migration, hibernation, courship rituals, territoriality, etc.)

2. Make a chart of animals that migrate. Identify their destinations and how far they will travel.

3. Give examples of animals that reproduce by cell division, regeneration, internal and external fertilization. Observe and keep records.

4. Draw diagrams of the life cycles of various animals: frog, butterfly, mouse, beetle, etc.

Materials

TEXTBOOKS

S.F. Science,
Level 4

Science, Level 5

ESS, "Brine Shrimp"
"Eggs and Tadpoles"
"Mealworms"

CAPTIONED FILMS

F177	Secrets of the Bee World
F593	Animal Reproduction
F643	Snails
F446	Summer Is Here
F448	Winter Is Here
F445	Fall Is Here
F91	Animals In Summer
F92	Animals In Winter
F90	Animals In Spring
F89	Animals In Autumn
F1075	Look Around You in Winter
F1099	The Octopus
F799	Penguins of the Antarctic
F625	Investigating Hibernation: The Golden-Mantled Ground Squirrel
F847	Insect Metamorphosis
F890	The Aphid Eaters: Eve's Research Project

Investigate the life cycles of animals (Materials, continued).

MORE CAPTIONED FILMS

F107	The Butterfly
F759	Don't
F830	Dragonflies: Flying Hunters of the Waterside
F757	The Big Green Caterpillar
F500	Frogs and How They Live
F136	Housefly and Its Control
F62	Life Cycle of the Paper Wasp
F852	Life Cycle of a Social Insect: The Ant
F850	Life Story of the Grasshopper
F851	Life Story of the Ladybird Beetle
F863	Passion Vine Butterfly
F876	Termites: Architects of the Underground
F881	Wasps: The Paper Makers of Summer
F182	The Story of a Trout
F1044	An Angelfish
F232	Eggs to Chickens
F823	Butterfly: The Monarch's Life Cycle
MF43	The Life of a Butterfly

FILMSTRIPS
Nests and Eggs (CF)
Animals Get Ready for Winter (CF)

BOOKS
Mason, George, Animal Baggage
Schwartz, E. & C., When Water Animals Are Babies
Selsam, Millicent, When an Animal Grows; Egg to Chick
Cole Joanna, A Calf Is Born
Bancroft, Henrietta, Animals in Winter
National Geographic, How Animals Behave
Overbeck, Cynthia, Ants; The Life of Insects
Sabin, Francene, The Amazing World of Ants

OTHER MATERIALS
SAVI Science Kit: Ways Animals Communicate
Study Prints:
    Animals
    Mysteries and Marvels of the Animal World

FIELD TRIPS
Zoo, natural history museum
National Museum of Natural History (insect zoo)

PA17 Investigate and describe adaptations of plants and animals.

UNIT TOPIC: Adaptations

ESTIMATED DURATION
3-4 weeks

Vocabulary

adaptation
defense
extinct
migration
protection
behavior

Subobjectives/Activities

Subobjectives:

A. Identify and describe adaptations of plants (conserving water, poisons, thorns, taste, etc.).
B. Identify adaptations of animals (coloration, shape, size, body coloration, speed, means of defense, etc.).
C. Identify several organisms, both plant and animal, that have adapted successfully to a changing environment.
D. Discuss how human beings have adapted to the environment over time.
E. Identify some organisms that did not adapt successfully and which are now extinct.
F. Identify behavioral adaptations of plants and animals: seeds and gravity, plants and light, pupil size and light, grooming, territoriality, migration, etc.

Activities

1. Research and list animals that change color.

2. Research and list animals that hibernate in the winter.

3. Report on how plants and animals adapt to the desert environment.

4. Identify poisonous plants and animals. Draw pictures of all the poisonous plants and animals.

5. Find pictures of animals that use camouflage for protection.

6. Research and report on one plant or animal that has made a successful adaptation.

Materials

TEXTBOOKS

Accent on Science,
Level 4, Unit 5

STEM, Level 6, Unit 6

S.F. Science, Level 3, Unit 7;
Level 4, Unit 5

CAPTIONED FILMS

F866	Protective Coloring
F1186	Why Animals Look Like They Do
F633	Nature's Camouflage
F590	Adaptations of Insects
F769	Desert Insects: A Story of Survival
F957	The Stream
F101	Bird Homes
F887	Adaptation to Ocean Environments
F108	Camouflage in Nature

FILMSTRIPS

The Desert: An Example of Adaptation (EB)
Why Do Animals Hide? (BFA)
Living Things Are Hard to See (EB)

PA17 Investigate and describe adaptations of plants and animals (continued).

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7. Research and report on one plant or animal that could not adapt and has become extinct.

8. Set up demonstrations of behavioral adaptation:
    - seeds using gravity
    - plants responding to light
    - pupils responding to light
    - earthworms responding to light
    - territoriality

BOOKS

Clarkson, Jan, Tricks Animals Play
Davis, Jane, Why Does the Tiger Have Stripes?
May, Charles, When Animals Change Clothes
Pallazzo, Tony, Animals of the Night
Rass, Wilda, Can You Find the Animal?
Selsam, Millicent, Hidden Animals
Wood, John N., Nature's Hide and Seek Oceans

OTHER MATERIALS

Study Prints:
- Mysteries and Marvels of Plant Life
- Mysteries and Marvels of the Animal World

National Geographic Kits:
- Life in a Pond
- Life at the Seashore
- Life in the Sea
- Life on a Coral Reef

S04 Identify the properties of sound.

UNIT TOPIC: Properties of Sound
(Also used as Objective E05 in the Energy area of study.)

ESTIMATED DURATION
2 weeks

Vocabulary

sound
conductor
insulator
vibration
intensity
frequency
measure
wave
Hz

Subobjective/Activities

Subobjectives:

A. Identify objects that cause sound.
B. Classify objects as sound conductors or insulators.
C. Recognize that sound is vibration.
D. Define intensity and explain how it is measured.
E. Define frequency and explain how it is measured.

Activities:

1. Cut out pictures of objects that produce sound.

2. Feel the vibrations of various objects:
    - tuning fork
    - guitar string
    - stretched rubber band
    - piano wires
    - vocal cords (feel throat)
    - loudspeaker cone (remove cloth covering)
    - musical insturments (drum, tambourine, trumpet, etc.)

3. Classify objects as sound conductors or insulators.

4. Define frequency. Do the following experiment to demonstrate changes in frequency. Tie a paper clip to a piece of thread. Start the clip swinging in the air. Count the number of swings in one minute.

   Now shorten the thread and try again. Is the frequency higher or lower with shorter thread? Test the frequencies of several different thread lengths and make a graph to illustrate the results.

Materials

TEXTBOOKS

Accent on Science
Level 4, Unit 6

S.F. *Science*,
Level 3, Unit 2; Level 5, Unit 5

Stem, Level 4,
Unit 8

Science, Level 4
Unit 4, Clusters A-1, A-2, A-3, A-4

Deyo, D. and Erting, L.,
Sound and Hearing: An Instructional Unit for Deaf students,
Objective #3

SO4 Identify the properties of sound (continued).

5. Produce high and low frequency sounds with an audiometer.

6. Discuss speech sounds with high frequencies: th, sh, f, k, s, etc.; low frequencies: most vowel sounds.

7. Produce loud and soft sounds with noisemakers or musical instruments. Show how sound becomes softer and quieter as you move away from the source.

8. Use a sound level meter to measure the volume of various sounds in decibels. Ask students to predict how loud some sounds might be: whisper, airplane, speech, running water, etc.).

S05 Identify parts of the ear and their functions.

UNIT TOPIC: The Ear

ESTIMATED DURATION
1 week

Vocabulary

middle ear
inner ear
pinna
ear canal
hammer
anvil
stirrup
eustachian tube
cochlea
semicurcular canals
ear wax

Subobjectives/Activities

A. Identify the parts of the outer ear and describe their functions.
B. Identify the parts of the middle ear and describe their functions.
C. Identify the parts of the inner ear and describe their functions.
D. Trace the path of sound through the ear structures.

Activities

1. Label the parts of the outer, middle, and inner ear.
2. Trace the path of sound through the ear.
3. Draw the anatomy of the ear from memory.

Materials

TEXTBOOKS

Deyo, D. and L. Erting, Sound and Hearing, an Instructional Unit for Deaf Students, Objective 1

Accent on Science, Level 4, Unit 6

S.F. Science, Level 5, Unit 5

STEM, Level 4, Unit 8

CAPTIONED FILMS
F458 The Ear and Hearing
F840 You and Your Ears

FILMSTRIP
World Book Encyclopedia, Vol, 6, page 8, 1980 edition, article: "Building an Artificial Ear."

S06 Identify methods of measuring hearing loss.

UNIT TOPIC: Measuring Hearing Loss

Vocabulary

audiologist
audiogram
decibel (dB)
Hertz (Hz)
audiometer
microphone
pure tone
frequency
pitch
loud
soft
earphones

Subobjective/Activities

Subobjectives:

A. Describe the work of audiologists.
B. Identify and explain the function of an audiogram.
C. Identify the instruments and the units used to measure hearing loss.
D. Demonstrate understanding of the audiogram and its relationship to various sounds.
E. Demonstrate understanding of one's own audiogram.

Activities

1. Ask an audiologist to visit the class and explain what he or she does.

2. Label the parts of an audiometer. Demonstrate its use.

3. Have students take turns in the audiometer booth, acting as both tester and testee. Let students work as many controls as they can for pure tone testing. The teacher or another hearing adult should be tested to demonstrate responses that are within normal limits.

4. Record test results on an audiogram.

5. Review student audiograms and compare hearing losses in class. Discuss the sounds each student can and cannot hear.

Materials

TEXTBOOKS
Deyo, D. and L. Erting, Sound and Hearing: An Instructional Unit for Deaf Students
Objectives #4 & 5

S07 Discuss what it means to be hearing impaired.

UNIT TOPIC: **Being Hearing-Impaired**

ESTIMATED DURATION
1 week

Vocabulary

deaf
hard-of-hearing
TTY
sign language
aural
oral
mild
moderate
severe
profound

Subobjectives/Activities

Subobjectives:

A. Identify labels applied to hearing impaired people and their implications.
B. Identify ways for deaf and hearing people to communicate.
C. Identify problems deaf people have in everyday living situations.
D. Discuss personal adjustments to deafness.

Activities:

1. Have students identify their own hearing losses as mild, moderate, severe, or profound based on their audiograms.

2. Classify people in school as hard-of-hearing, deaf, or hearing based on their use of:

   telephone
   voice
   hearing aids
   TDD
   sign language
   understandable speech

3. Report on ways deaf and hearing people communicate: TTY, paper and pencil, sign language, speechreading, cued speech, interpreters, etc.

4. Make posters illustrating common problems for deaf people in everyday situations; for instance, not hearing smoke detectors or change falling from pockets, having trouble ordering in restaurants, asking directions, etc.

5. Write an essay about your own adjustment to deafness.

Materials

TEXTBOOK
Deyo & Erting, Sound and Hearing, An Instructional Unit for Deaf Students, Objective #6

Captioned Films

F1640	Clown White
F506	A Helping Hand
F1348	Deaf Like Me
F1416	See What I Say
F1558	Sign of Victory
MF29	Speeding Car
MF72	One to Speak, One to Hear
SF23	It's OK to Be Deaf - Denise
SF24	Daddy, Can I Hear the Sun?

C05 Describe ocean features and resources.

UNIT TOPIC: Oceans

ESTIMATED DURATION
1-2 weeks

Vocabulary

ocean
wave
crest
trough
surf
tsunami
tide
current
continental shelf
continental slope
plain
trench
resource

Subobjectives/Activities

Subobjectives:

A. Identify oceans and seas on a globe.
B. Name some properties of ocean water (minerals, salts, gases).
C. Identify parts of a wave.
D. Describe the effects of tides.
E. Locate major ocean currents.
F. Identify features in the ocean: trench, plain, volcano, ocean ridge, continental slope, continental shelf, etc.)
G. Identify some forms of ocean life.
H. Identify ocean resources that people use (food, kelp, minerals, water, salt, gas, oil, energy).

Activities

1. Label oceans and seas on a world map or globe.

2. Fill a large container with water. Saturate the water with salt. Allow the water to evaporate completely Use a hand lens to observe the crystals formed in the container. Compare to table salt.

3. Fill a clear plastic container with water, to 5 cm from the top. Have students work in pairs, with one blowing across the surface of the water and the other measuring the wave heights at the opposite side of the container. Mark the height of waves with masking tape.

4. Research and report on major tsunamis.

5. Label major ocean currents: North and South Equatorial, Gulf Stream, Humboldt Current.

6. Discuss ways to protect the oceans.

Materials

TEXTBOOKS
Accent on Science,
Level 4, Unit 7

Suggested Field Trips
National Aquarium
Natural history museum

Captioned Films
F514 Oceanography: The Study of the Ocean
F516 One Big Ocean

Other Materials
Oceanography
Understanding the Sea
(duplicating masters)
A Look at the Earth Around Us:
Oceans (National Geographic Kit)

F06 Investigate magnets and their uses.

UNIT TOPIC: Magnets

ESTIMATED DURATION
1-2 weeks

Vocabulary

magnetic
non-magnetic
magnet
compass
poles
magnetic fields
electro-magnet

Subobjectives/Activities

Subobjectives

A. Classify materials as magnetic or non-magnetic.
B. Compare the relative strengths of different magnets.
C. Make a magnet.
D. Construct simple compasses and explain how they work.
E. Distinguish between magnetic north and true north.
F. Distinguish between the Earth's geographic and magnetic poles.
G. Investigate magnetic fields.
H. Construct an electromagnet and demonstrate its use.
I. Investigate the poles of a magnet and their characteristics.
J. Identify ways magnets are used in tools.

Activities

1. Test relative strengths of different magnets.

2. Make a magnet and a compass. Demonstrate how they work.

3. Construct an electromagnet.

4. Show evidence of magnetic fields.

Materials

TEXTBOOKS
Stem, Level 6, Unit 3
S.F. Science, Level 6, Unit 5
Accent on Science, Level 4, Unit 8

BOOKS
Adler, Irving, Magnets
Starting Point Library, Magnets

CAPTIONED FILMS
F557 Magnets for Beginners
F556 Magnets and Their Uses

FILMSTRIPS
Electricity & Magnets (FH)
Discovering Magnets (JH)
Different Kinds of Magnets (JH)
Magnets Help Find Direction (JH)
Magnets Can Attract Through Objects
What Is Magnetism? (JH)
Magnets (JH)
Working With Magnets (EGH)
Magnets and Electricity (SVE)
Science at Work (EB)
Finding Out About Magnets (SVE)
The Mysterious Magnet (PH)
Whys of Elementary Science:

OTHER MATERIALS
Simple Science
SAVE Kit: Magnetism & Electricity

E06 Identify the characteristics of electric energy.

UNIT TOPIC: Exploring Electric Energy

ESTIMATED DURATION
2 weeks

Vocabulary

battery
bulb
wire
switch
circuit
complete
parallel
series
receiver
source
variable
conductor
insulator
electricity
static electricity

Subobjectives/Activities

Subobjectives:

A. Identify the parts of an electrical system (battery, bulb, wire, etc.).
B. Identify complete and incomplete circuits.
C. Explore the ways circuits are connected (parallel, series).
D. Identify variables in a circuit (number of receivers, source of energy).
E. Identify conductors and insulators in an electrical energy system.
F. Identify safety rules for using electricity.
G. Identify equipment used to measure electricity, and demonstrate its use.
H. Investigate static electricity.

Activities:

1. Label parts of an electrical system.

2. Construct complete and incomplete circuits.

3. Investigate ways circuits can be connected (parallel or series). Draw your circuits.

4. Classify materials as conductors or insulators.

5. Review and list safety rules for using electricity.

6. Demonstrate the use of a volt meter.

7. Plan experiments with static electricity, then demonstrate to another class. Write up the experiments.
   a. Rub a balloon on wool and stick it on the wall.
   b. Rub plastic rulers on wool and use them to move a ping-pong ball across a table (2 players).
   c. Rub a plastic comb on wool and use it to pick up pieces of paper.

Materials

TEXTBOOKS

Accent on Science
Level 4, Unit 8

Science, Level 4, Unit 4
Clusters C-1, C-2, C-3

STEM, Level 4, Unit 3

S.F. Science, Level 3, Unit 3

ESS, "Batteries and Bulbs"

CAPTIONED FILMS
F540 Electricity
F770 " —Handle With Care
F120 " —Principles of Safety
F541 " —Wires in Your Home

FILMSTRIPS
Public Utilities in a Big City
Electricity (EB)
Finding Out About Electricity
Communication by Electricity
How Electricity Helps Us (FH)
Current Electricity (FH)

E06 Identify the characteristics of electric energy.

8. Build a game board that lights up when the right answer is given.

9. Make a flashlight.

BOOKS

Feravolo, Rocco, Junior Science Book of Electricity
Pine, Tillie S., Electricity and How We Use It
Neal, Charles, Safe and Simple Projects with Electricity
Epstein, Sam, First Book of Electricity
Freeman, M, Story of Electricity
Nelson, L., & Lorbeer, G., Science Activities for Elementary Children, pg. 22

Bains, R, Discovering Electricity
Branley, E., and Vaughan, E., Rusty Rings a Bell
Kerner, Ben, Electricity

OTHER MATERIALS

SAVI Science Kit: Magnetism & Electricity
Study Print: Energy and Matter
Batteries and Bulbs (kit)

FIELD TRIPS

Maryland Science Center
Local power companies may offer tours or materials.

PA18 Investigate the life cycles of plants.

UNIT TOPIC: Life Cycles of Plants

ESTIMATED DURATION
3-4 weeks

Vocabulary

life cycle
annual
perennial
reproductive cycle
photosynthesis
chlorophyll
germination
pollination
fertilization

Subobjectives/Activities

Subobjectives:

A. Investigate and record seasonal changes in plants: flow of sap, color, leaves, dormancy, death.
B. Classify plants as annuals or perennials.
C. Classify plants according to their reproductive cycles.
D. Investigate the life cycles of various kinds of plants.
E. Describe the process of photosynthesis.

Activities

1. Describe how plants behave during different seasons.

2. Visit a tree farm where they collect maple syrup in spring.

3. Classify plants as annuals or perennials.

4. Diagram the life cycle of a flowering plant.

5. Diagram the life cycle of a cone-bearing plant.

FIELD TRIPS
Brookside Gardens (MD)
Audubon Naturalist Society
National Arboretum (DC)
Botanical Gardens

Materials

TEXTBOOKS
S.F. Science, Level 4, Unit 7

Accent on Science, Level 3, Unit 1

ESS: "Budding Twigs"

CAPTIONED FILMS

F445	Fall Is Here
F446	Summer Is Here
F448	Winter Is Here
F459	Winter Comes to the Forest
F652	Winter: Story of Survival

FILMSTRIPS
Finding Out How Plants Grow (SVE)
Plants (EGH)
Growth from Seed (EB)

BOOKS
Darby, Gene, What Is a Plant?
Jordan, Helene, Seeds by Wind and Water
Gutnik, Martin, How Plants Are Made
What Plants Produce
Selsam, Millicent, Seeds and More Seeds

OTHER MATERIALS
Study Prints: Trees to Know
Mysteries and Marvels of Plant Life
SAVI Science Kit: Structures of Life
000-970 Trees to Know

PA19 Identify uses of plants.

UNIT TOPIC: Uses of Plants

ESTIMATED DURATION
3-4 weeks

Vocabulary

raw material
wood pulp
tannic acid
cork
latex
rubber
fiber
dye
medicine
drugs
fruits
vegetables
nuts
roots
stems
leaves

Subobjectives/Activities

Subobjectives:

A. Identify plants or parts of plants used for food.
B. Identify and classify plants as fruits or vegetables.
C. Identify products made from trees and other raw plant materials.
D. Identify some drugs made from plants.
E. Discuss how plants can guard against soil erosion.

Activities

1. Research how plants are used in various parts of the world.
2. Set up a display of things made from plant materials.
3. Identify drinks made from plants.
4. Make baskets from plant materials.
5. Have students keep records of everything they use in one day that comes from plants.

Materials

TEXTBOOK
Accent on Science,
Level 4, Unit 9

CAPTIONED FILM
F260 How Plants Help Us

OTHER MATERIALS
Plants and People
(National Geographic Kit)
Understanding Plants
(duplicating masters)

PA20 Investigate vertebrate animals.

UNIT TOPIC: Vertebrates

ESTIMATED DURATION
3-4 weeks

Vocabulary

vertebrate column
backbone
mammal
reptile
amphibian
bird
fish
scales
gills
cold-blooded
warm-blooded
fur
hair
feathers

Subobjectives/Activities

Subobjectives:

A. Define vertebrates as a group of animals with backbones.
B. Identify some common vertebrates.
C. Explain the protective function of the spinal column.
D. Compare the vertebrae of selected animals.
E. Separate vertebrates into classes: mammals, reptiles, amphibians, birds, and fish. List the characteristics of each class.

Activities:

1. Classify pictures of animals as vertebrates or invertebrates.

2. Write a report on one vertebrate.

3. Make a chart classifying pictures of animals as mammals, reptiles, amphibians, birds, and fish (include people as mammals). List the characteristics of each group.

Materials

TEXTBOOKS

STEM, Level 5, Unit 2

Accent on Science
Level 5, Unit 1

S.F. Science,
Level 5, Unit 1

CAPTIONED FILMS

F1109	The Apes
F213	Fish Are Interesting
F625	Investigating Hibernation
F558	Mammals and Milk
F162	Mammals Are Interesting
F568	Snakes and How They Live
F86	Amphibians; Frogs, Toads, and Salamanders
F982	Introduction to Reptiles
F629	Looking at Amphibians

BOOKS

Ommanney, F., The Fishes
Zim, Herbert, Mammals;
Reptiles and Amphibians;
Birds
Carr, Archie, Reptiles
Carrington, Richard, The Mammals
Gregory, O.B., Whales
Cook, David, Birds
Boorer, Michael,
The Life of Strange Mammals

OTHER MATERIALS

SP111 Reptiles and Amphibians (study prints)
001-778 Birds (duplicating masters)
003-173 Mammals and How They Grow (National Geographic Kit)

FIELD TRIPS

Local zoo
Aquarium
Reptile farm

PA21 Investigate invertebrate animals.

UNIT TOPIC: Invertebrates

ESTIMATED DURATION
3-4 weeks

Vocabulary

invertebrate
jointed
arthropod
exoskeleton
arachnid

Subobjectives/Activities

Subobjectives:

A. Define invertebrates as animals without backbones.
B. Identify some common invertebrates.
C. Classsify invertebrates with jointed legs as arthropods.
D. Distinguish insects from other arthropods.
E. Classify spiders as arachnids on the basis of observable characteristics.
F. Identify and describe a few other invertebrate groups besides arthropods.
G. Identify some characteristics that distinguish arthropods from other invertebrates.

Activities:

1. Make a collage using pictures of invertebrates.

2. List characteristics of arthropods:
   a. exoskeleton
   b. jointed legs

3. Classify two kinds of arthropods and list their characteristics

Insects	Spiders (arachnids
a. 3 pairs of legs	a. 4 pairs of legs
b. 3 body segments: head thorax abdomen	b. 2 body segments: abdomen cephalothorax
c. may have wings	c. no wings

4. Start an arthropod collection. Observe and compare them.

Materials

TEXTBOOKS

S.F. Science, Level 5, Unit 1

STEM, Level 5, Unit 2

Accent on Science, Level 5, Unit 1

CAPTIONED FILM
F972 Black Widow Spider

BOOKS

Bason, Lillian, Spiders
Hogner, Dorothy, Spiders
Selsam, Millicent, & Hunt, Joyce, A First Look at Spiders

OTHER MATERIALS
Insects (activity book)

PA21 Investigate invertebrate animals (continued).

5. Identify invertebrates that are mollusks. Collect shells of mollusks.
6. Identify kinds of worms: flatworms
   segmented worms
   round worms
7. Observe worms and their tunnels.
8. Research and report on parasitic worms in animals and humans.

PM07 Measure relative properties of matter using the metric system.

UNIT TOPIC: Introduction to the Metric System

ESTIMATED DURATION
2-3 weeks

Vocabulary

measure
metric
system
millimeter
centimeter
decimeter
meter
volume
milliliter
ruler
liter
unit
meter stick
tape measure
balance
gram

Subobjective/Activities

Subobjectives

A. Measure the dimensions of objects in metric units.
B. Measure the weight of objects in metric units.
C. Measure and calculate the volume of liquids and solids in metric units.
D. Identify tools used to measure solids and liquids and demonstrate their use.

Activities

1. Use a meter stick to measure the length of the hallway.
2. Measure your body using a measuring tape with metric units (cm).
3. Measure volume of liquids in millimeters.
4. Weigh objects in grams.
5. Find your weight in grams.
6. Measure the dimensions of an object using centimeters.

Materials

TEXTBOOKS
Accent on Science
Level 2, Chapter 3
Stem, Level 3, Unit 1
Science, Level 2, Unit 2,
Clusters C-1, C-2

CAPTIONED FILMS
F32 The Metric System
F705 A Metric America
F987 Metric--Measurement for Today

FILMSTRIPS
Using Standard Units (CO)
Measuring Length (CO)
Measuring Weight (CO)
Measuring How Long (JH)
Measuring How Much (JH)
Introducing the Metric System (EFP)
Linear Measure (EFP)
Measuring Weight & Volume (EFP)

OTHER MATERIALS
Set of Metric Containers
Metric Scale
SAVI Science Kit: Measurement Module

FIELD TRIP
Maryland Science Center: "Think Metric"

PM08 Describe and classify physical and chemical changes in states of matter.

UNIT TOPIC: Changes in States of Matter

ESTIMATED DURATION
2 weeks

Vocabulary

change
chemical change
physical change
mixture
solution
acids
base

Subobjectives/Activities

Subobjectives:

A. Classify changes: are they chemical or physical changes?
B. Describe and classify changes in acids and bases.
C. Differentiate between mixtures and solutions.
D. Describe and classify changes in matter occuring in mixtures and solutions.
E. Compare objects before and after chemical or physical changes.

Activities:

1. Cause physical changes in objects by cutting, bending, tearing, melting, boiling, adding air, etc.

2. Cause chemical changes in objects by burning, rusting.

3. Test to find acids and bases using litmus paper. Identify the PH of each.

4. Explain the difference between mixtures and solutions.

5. Compare an object before and after a physical change and a chemical change.

Materials

TEXTBOOKS

Stem, Level 5, Unit 7

Science, Level 5, Unit 4, Clusters C-1, C-2, C-3

S.F. Science, Level 5, Unit 4, Chapters 12, 13

Accent on Science, Level 6, Unit 2

ESS, "Balloons & Gases," "Mystery Powders"

STUDY PRINTS

Energy & Matter

CAPTIONED FILMS

F702 A Look at Chemical Change
F691 How Things Dissolve

FILMSTRIPS

Finding Out About Heating Solids, Liquids, and Gases (SVE)

C06 Describe how the air affects the weather.

UNIT TOPIC: Air Affects Weather

ESTIMATED DURATION
2 weeks (in conjunction with C07)

Vocabulary

weather
temperature
humidity
wind
air pressure
barometer
anemometer
climate
cloud
rain gauge
wind chill
direction

Subobjectives/Activities

Subobjectives:

A. Describe how air temperature affects the weather and demonstrate how to measure it.
B. Describe how air moisture affects weather and demonstrate how to measure it.
C. Describe how air movement affects the weather and demonstrate how to measure it.
D. Describe how air pressure affects the weather and demonstrate how to measure it.

Activities:

1. Bring in weather information from a local paper. Make a chart like the one below and fill it out for two weeks.

Date	Barometer Reading, AM/PM	High/Low Temperatures	Precipitation	Highest Wind Velocity	Cloud Cover

2. Measure air temperature with a thermometer; Compare temperature measurements above different surfaces (grass, soil, driveway, etc.)

3. Make wind valances and test their accuracy.

4. Use the Beaufort scale to check wind speed (See Accent on Science, Level 5, Unit 3, Page 91).

Materials

TEXTBOOKS

Accent on Science
Level 5, Unit 3
S.F. Science Level 4, Unit 2, Chapter 3
STEM, Level 5, Unit 4

FILMSTRIPS
Why Do We Have Wind? (FH)
Weather (EB)
Why Does the Wind Blow? (SVE)
Busy Wind, Our Invisible Friend (TA)
Finding Out About Clouds (SVE)
We Can Make Simple Weather Instruments (VE)

CAPTIONED FILMS
F194 Wind and What It Does
F797 The Ocean of Air

C06 Describe how the air affects the weather (continued)

5. Make an anemometer.
6. Identify daily cloud types observed in the sky.
7. Measure rainfall using a rain gauge.
8. Discuss the need for wind breaks (to prevent erosion of the soil).

OTHER MATERIALS

Duplicating masters:
- Weather Science
- The Earth, Sun, & Stars (also includes clouds)
- Understanding Weather

Weather Around Us
Weather
Weather Chart

STUDY PRINTS

Simple Science
Air and Weather
Weather Instruments

BOOKS

Updegraff, Imelda & Robert, *Weather*
Bendick, Jeanne, *The Wind*
Powers, Richard, *A Fresh Look at Clouds*

C07 Describe how people predict the weather.

UNIT TOPIC: Forecasting the Weather

ESTIMATED DURATION
2 weeks (in conjunction with C06)

Vocabulary

- weather
- predict
- forecast
- front
- air mass
- storm
- hurricane
- blizzard
- tornado
- stable
- unstable
- lightning
- thunder
- relative humidity
- barometer
- rain gauge
- temperature
- high
- low
- cirrus
- stratus
- cumulus
- cloud formation
- wind chill

Subobjectives/Activities

Subobjectives:

A. Identify scientists who study the weather.
B. Recognize and describe the properties of common types of air.
C. Identify cloud formations and the weather conditions associated with each type.
D. Identify severe weather conditions and their hazards.
E. Identify kinds of weather instruments used to keep records of the weather and demonstrate their use.
F. Differentiate between weather and climate.
G. Define weather terms: fog, hail, sleet, blizzard, air quality, humidity, smog, dew point, frost, water vapor.

Activities

1. Make a wind child factor chart. Use your chart to find the wind chill for a given day.

2. Observe, identify, and record cloud formations for a week or a month.

3. Research what kinds of weather are associated with each type of cloud formation. Write a report.

4. Observe cloud formations and try to predict the weather.

5. Elect a class weather forecaster for the week or the month. Have a daily weather forecast in class.

6. Construct simple barometers, rain gauges, climometers, and thermometers, and demonstrate their use.

Materials

TEXTBOOKS

Accent on Science, Level 5, Unit 3

Science, Level 5, Unit 4;
Level 6, Unit 3

S.F. Science, Level 4, Unit 2

FILMSTRIPS

Why Does the Weather Change? (SVE)
Let's Look at the Weather (WD)
Finding Out About Clouds (SVE)
Rain, Hail, and Sunshine (TA)
Flood! (SVE)
We Can Make Simple Weather Instruments (VE)
Weather (EB)
Why Does the Wind Blow? (SVE)
Tornado (SVE)

CAPTIONED FILMS

f797 The Ocean of Air
F808 Your Chance to Live: Tornado
F873 Storms: The Restless Atmosphere

C07 Describe how people predict the weather (continued).

7. Research one severe weather condition, such as a tornado, hurricane, typhoon, or blizzard. Find out what causes the condition and how it might be predicted.

8. Make posters showing what to do in case of a tornado, hurricane, or blizzard.

9. Experiment with warm and cold air. Discuss how the results are related to weather.

BOOKS

Berger, Melvin, *Storms*
Branley, Franklyn, *Flash, Crash, Rumble, and Roll*;
    Rain and Hail
Kirk, Richard, *The Lightning and the Rainbow*
Updegraff, I. & R., *Weather*
Powers, R., *A Fresh Look at Clouds*
Barr, J., *What Will the Weather Be?*
Laird, C. & R., *Weathercasting*
Pine, Tillie & Joseph,
    Weather All Around
Wolfe, Louis, *Let's Go to a Weather Station*
Fradin, Dennis B., *Disaster! Tornadoes*; *Disaster! Blizzards*
Thompson, B., & Overbeck, C.,
    The Winds That Blow

OTHER MATERIALS

Air and Water
Weather Chart
Weather Around Us
Weather
Study Prints
    Simple Science
    Air and Weather
Duplicating Masters
    Understanding Weather
    Weather Science
    Earth, Sun, and Stars

A07 Describe the seasons in terms of the Earth's movement around the sun.

UNIT TOPIC: Reasons for Seasons

ESTIMATED DURATION
2 weeks

Vocabulary

axis
orbit
season
direct rays
slanted rays
model

Subobjectives/Activities

Subobjectives:

A. Describe the Earth's axis and its orbit around the sun.
B. Describe the position of the Earth in relation to the sun during each season.
C. Compare the seasons of different countries around the Earth at specific times.
D. Describe the angle of the sun's rays (direct or slanted) during different seasons.
E. Construct a model to show the relationship of the Earth and the sun during each season.

Activities:

1. Demonstrate the position of the Earth in relation to the sun in each season. Infer from the Earth's tilt whether it is summer or winter.
2. Compare the seasons in the U.S. with those in Australia.
3. Draw the angle of the sun to the U.S. during every season.
4. Investigate day and night near the North Pole during the seasons.

Materials

TEXTBOOKS

STEM, Level 6, Unit 3

Accent on Science,
Level 5, Unit 3, Chapter 2

S.F. *Science*, Level 5,
Unit 7, Chapter 18

FILMSTRIPS
Our Home, the Earth (SVE)

BOOKS

Knight, David C.
Let's Find Out About the Earth
Branley, Franklyn,
Sunshine Makes the Seasons

OTHER MATERIALS
The Earth, Sun, and Stars
(duplicating masters)

HGR06 Identify and describe four basic body systems that provide support and protection, movement, and coordination of body functions.

UNIT TOPIC: **Body Systems I**

ESTIMATED DURATION
2-3 weeks

Vocabulary

- skin
- pores
- pain
- touch
- skeleton
- rib
- bone
- skull
- dermis
- pigment
- joints
- calcium
- ligaments
- sprain
- fracture
- muscles
- tendons
- contract
- relax
- nervous system
- brain
- cerebrum
- spinal cord
- nerves
- reflex

Subobjective/Activities

Subobjectives:

A. Identify the structure and functions of the skin.
B. Identify the structure and functions of the skeletal system.
C. Identify the structure and functions of the musculatory system.
D. Identify the structure and functions of the nervous system.

Activities:

1. Make a "My Body" book showing different bodily systems.
2. Look at slides of skin and hair under the microscope.
3. Discuss the relationship between skin cancer and tanning.
4. Hold arm wrestling contests to see who is strongest.
5. Have students take a physical fitness tests to determine the fitness of the class.
6. Observe the brain of a calf, sheep, or pig.
7. Test classmates' reflexes.

Materials

TEXTBOOKS

Accent on Science
Level 5, Unit 4

Science, Level 5
Unit 1, Cluster B-1

Stem, Level 4, Unit 6

S.F. Science, Level 6 Unit 3

CAPTIONED FILMS

F391 About the Human Body
F473 Our Human Body: How Its Parts Work Together
F932 Man: The Incredible Machine

OTHER MATERIALS

Systems of the Human Body
Human Body Systems
Inside Me

HSN08 Identify drugs, their uses and effects.

UNIT TOPIC: **Drugs**

ESTIMATED DURATION
2 weeks

Vocabulary

drug
habit
prescription
legal
illegal
swallow
apply
inhale
drug abuse

Subobjectives/Activities

Subobjectives:

A. Identify good and bad habits.
B. Differentiate between prescription and non-prescription drugs.
C. Differentiate between legal and illegal drugs.
D. Identify reasons why people take drugs (both legal and illegal).
E. Recognize different methods of using drugs (swallowing, applying to the skin, injecting, inhaling).
F. Identify harmful effects of drugs.
G. Identify ways to prevent drug abuse.

Activities:

1. Define "habit." Brainstorm lists of good habits and bad habits.

2. Try to break a bad habit.

3. Take a survey asking people to name their good and bad habits. Publish the results (do not use names).

4. Take a survey to find out how people started smoking and how and why they quit.

5. Use an Rx symbol to classify prescription and non-prescription drugs.

6. Visit a pharmacy and talk to a pharmacist about prescription and non-prescription drugs

Materials

CAPTIONED FILMS
F604 Easy Way Out
F613 Focus on Marijuana
F653 Your Amazing Mind
F685 From Runaway to Hippie
F642 Smoking: It's Your Choice

FILMSTRIPS
Drugs and Your Body (HMS)
Drugs in Our World (HNS)

BOOKS

Elgin, Kathleen,
The Ups and Downs of Drugs
Hozinsky, Murray,
Is This Trip Necessary? Student Drug Abuse

7. Cut out advertisements for various over-the-counter drugs. Make a chart listing various body parts and body systems. Glue each ad under the part or system that the drug is intended to affect.

8. Make a chart naming illegal drugs and legal drugs.

9. Read labels on drugs to find out how they are used.

10. Bring in articles from newspapers and magazines about the harmful effects of drugs. Discuss, then make a book about "The Dangers of Drug Abuse."

11. Make a poster to warm people about the effects of a particular illegal drug.

12. Discuss ways to prevent drug abuse. Report on one way. Make posters showing ways to prevent drug abuse.

13. Discuss ways people abuse legal drugs.

OTHER MATERIALS

Giant Inflatable Cigarette (lists tar and nicotine content of cigarette brands.
Posters of internal organs, showing effects of substance abuse.
Alcohol's Trip Through the Body (poster)
Smoking and Children (kit)
Drug Posters
Pamphlets on Smoking
Facts About Drugs (study prints)
Drug Information kit
Drug Enforcement, Drugs of Abuse (teacher resource)
Little Smokey (kit)
How to Buy and Use Medicines
WOW! (kit showing cigarette poisons)
Drugs and Children (kit)

F07 Investigate the direction and strength of forces.

UNIT TOPIC: Investigating Forces

ESTIMATED DURATION
1 week

Vocabulary

force
strength
direction
balanced forces
vector arrow
variables
motion

Subobjectives/Activities

Subobjectives:

A. Demonstrate ways to exert force on a moving object. Cause it to move, speed up, change direction, slow down, or stop.
B. Investigate balanced forces (forces that act without producing motion).
C. Use and interpret a vector arrow to determine the strength and direction of the force it represents.
D. Compare relative strength of forces.
E. Identify forces acting in pairs.
F. Identify variables in change of motion (strength of force, time, mass).

Activities:

1. Demonstrate balanced and unbalanced forces.

2. Classify forces as balanced or unbalanced.

3. List forces that act in pairs; for example:
   Book on a table.
   Coat on a hook.

4. Design a way to test the strength of different kinds of string: shoelace, fishing line, etc.

5. Draw vector arrows to show the direction and relative strength of the force in a picture. Use darker, heavier arrows to show the stronger force.

Materials

TEXTBOOKS

Stem, Level 5, Unit 6
Level 6, Unit 4

Science, Level 5, Unit 2,
Clusters A-1, A-2

Accent on Science,
Level 5, Unit 5

ESS, "Pendulums"
"Structures"

CAPTIONED FILM

F126 Forces: Composition and Resolution

F08 Describe the effects of friction on motion.

UNIT TOPIC: Friction

ESTIMATED DURATION
3 days to 1 week

Vocabulary

friction
surface
weight
lubricant
oil
wear
motion

Subobjectives/Activities

Subobjectives:

A. Define friction and demonstrate its effect on the motion of an object.
B. Infer whether an object will be hard or easy to move.
C. Identify some advantages and disadvantages of the effects of friction on motion (walking, slipping on rugs, etc.).
D. Identify the factors that affect amounts of friction: surface, weight, surface area contact, etc.
E. Identify ways to reduce friction: lubricants, wheels, ice, etc.
F. Explain how friction causes wear.

Activities:

1. Classify friction in various situations as helpful or not helpful.

2. Demonstrate how surface area, weight, and surface contact can affect the amount of friction.

3. Experiment with different surface materials to see which produce more friction.

4. Experiment to find out which lubricants work best.

5. Collect objects that show wear from friction.

Materials

TEXTBOOKS

Stem, Level 4, Unit 5

S.F. Science, Level 4, Unit 6

Accent on Science, Level 5, Unit 5

Science, Level 5, Unit 2

CAPTIONED FILMS
F1058 Friction: A First Film
F127 Friction All Around

FILMSTRIP
Work and Friction (JH)

BOOKS
Pine, Tillie and Levine, Joseph, Friction All Around
Liss, Howard, Friction

F09 Measure forces and their effects.

UNIT TOPIC: Measuring Forces **ESTIMATED DURATION**
1 week

Vocabulary

gravity
force
scale
buoyant force
measure
balance
spring scale
weight

Subobjectives/Activities

Subobjectives:

A. Use spring scales to investigate and measure the force of of gravity.
B. Investigate and measure buoyant force using a spring scale.
C. Investigate and measure mass, using scales and balances.
D. Distinguish between mass and weight.

Activities

1. Weigh objects on a spring scale to measure and compare the force of gravity.

2. Weight objects in and out of water using a spring scale. Compare the force of gravity.

3. Measure mass using different balances and scales.

4. Define mass and weight. Discuss the mass and weight of objects in space.

Materials

TEXTBOOKS
STEM, Level 5, Unit 6;
Level 6, Unit 6

Science, Level 5, Unit 2

Accent on Science, Level 5, Unit 5

ESS, "Kitchen Physics"

CAPTIONED FILMS

F1566	Studying Gravitation and Mass
F13	Gravity: How It Affects Us

FILMSTRIPS
Energy (AP)
Our Home, the Earth (SVE)
How Gravity Works (FH)

BOOKS
Branley, Franklyn, Gravity Is A Mystery
Milgrom, Harry, First Experiments With Gravity
Selsam, Millicent, Up, Down, and Around

OTHER MATERIALS
Action Lab Kits: Water Spout, Spinning Balance
Simple Science

FIELD TRIP
Maryland Science Center

F10 Investigate simple machines and the work they perform.

UNIT TOPIC: Investigating Simple Machines

ESTIMATED DURATION
2 weeks

Vocabulary

complex
simple
lever
inclined plane
wheel and axle
gears
pulley

Subobjectives/Activities

Subobjectives:

A. Classify machines as complex or simple.
B. Investigate the use of the inclined plane and identify its uses in everyday objects and machines.
C. Investigate the lever and identify its uses in everyday objects and machines.
D. Investigate the wheel and axle in rotating objects. Identify their uses in common objects and machines.
E. Investigate gears and pulleys and identify their uses in common objects and machines.
F. Classify machines as inclined planes, levers, wheels and axles, gears, or pulleys.

Activities

1. Classify machines as simple or complex.
2. Identify simple machines within complex machines.
3. Identify the parts of a lever and experiment with changing the fulcrum point.
4. Given the direction of the first gear in a set of gears, identify the direction each of the other gears will move.
5. Make a pulley system to demonstrate how it reduces the force needed to lift an object.
6. Classify different machines as gears, pulleys, levers, wheels and axles, or inclined planes.

Materials

TEXTBOOKS

Science, Level 5, Unit 2, Clusters C-1, C-2, C-3

S.F. Science, Level 4, Unit 6

Accent on Science, Level 3, Unit 2

CAPTIONED FILMS

F161 Machines Do the Work
F359 Machines Help Us
F567 Simple Machines at Sea

FILMSTRIPS

Simple Machines (SVE)
Machines (EB)
Machines and Tools Help Us Work (SVE)
Finding Out About Simple Machines (SVE)
Machines and Tools to Help Us Work (SVE)
Machines Make Work Easier (VE)
Wheels Make Our Work Easier (VE)
How Ramps and Screws Help Us (FH)
How Wedges Help Us (FH)
Machines: What They Do (MDC)
Inclined Planes (JH)
Levers at Work (JH)
Pulleys at Work (JH)
Wheels and Axles at Work (JH)

7. Make a mobile for the class. Explain how a knowledge of levers helped you balance the mobile.

BOOKS

Darby, Gene, *What Is a Simple Machine?*
Wade, Harlan, *The Lever*; *Gears*; *Springs*
Clymer, Eleanor, *Wheels*
Kohn, Bernice, *Ramps*
Sharp, Elizabeth, *Simple Machines and How They Work*
Miller, Lisa, *Levers*; *Wheels*
Hoban, Russell, *What Does It Do and How Does It Work?*
Crocker, Constance, *Let's Build*
Leavitt, Jerome, *True Book of Tools For Building*
Notkin, Jerome, *How and Why Wonder Book of Machines*
Liberty, Gene, *First Book of Tools*

OTHER MATERIALS

Study Prints: Simple Machines

FIELD TRIPS

Children's museum
Science/technology museum
National Museum of American History

A08 Describe the characteristics and motions of the stars.

UNIT TOPIC: **Stars**

ESTIMATED DURATION
2 weeks

Vocabulary

stars
size
brightness
constellation
distance
temperature
twinkle
rotation

Subobjectives/Activities

Subobjectives:

A. Observe the differences in apparent size and brightness of various stars in the sky.
B. Observe and identify common constellations in the sky.
C. Identify and describe the sun as a star.
D. Understand that the apparent brightness of a star depends both on its ability to produce light and its distance from the Earth. Note that the color of a star depends on its temperature.
E. Explain in general terms why stars seem to twinkle.
F. Describe the apparent turning of the stars and constellations in terms of the rotation of the Earth.
G. Observe the constellations during different seasons.

Activities:

1. Have a constellation search. Identify and draw as many constellations as you observed in one week.

2. Write a report on the sun as a star.

3. Find out about how stars are "born."

4. Investigate why stars appear to twinkle.

5. Discuss why the constellations appear to be in different positions during different seasons. Demonstrate with a model of the solar system.

Materials

TEXTBOOKS

STEM, Level 4, Unit 7

Accent on Science, Level 4, Unit 3
Level 5, Unit 6, Chapter 1

S.F. Science, Level 6, Unit 8,
Chapters 20,21

CAPTIONED FILMS
F8 Exploring the Night Sky

FILMSTRIPS
Man Studies the Stars (WD)
The Night Sky (EB)
Astronomy Through the Ages (EB)
The Stars (EB)

BOOKS
Hoss, Norman,
How and Why Wonder Book of Stars
Podin, Daniel, What Is a Star?
Zim, Herbert, Shooting Stars,
The Sun, Outer Space

OTHER MATERIALS
50 Facts About Space
The Earth, Sun, and Stars

E07 Identify two general types of energy and the forms they can take

UNIT TOPIC: Forms of Energy

ESTIMATED DURATION
3 days

Vocabulary

energy
potential energy
mechanical energy
chemical energy
heat energy
electric energy
radiant energy
solar energy

Subobjectives/Activities

Subobjectives:

A. Identify and demonstrate kinetic and potential energy.
B. Describe different forms of energy: mechanical, chemical, electric, radiant, and solar energy.

Activities:

1. Ask students to think of examples of kinetic energy and potential energy.
2. Using pictures of moving people and objects, ask students to identify kinetic and potential energy.
3. Have a static electricity fair. Find hands-on activities that show students how to generate static electricity.

Materials

TEXTBOOKS

Accent on Science, Level 5, Unit 7

E08 Identify the transmission and transformation of energy from one form to another.

UNIT TOPIC: Energy Transmission and Transformation

ESTIMATED DURATION
2 weeks

Vocabulary

transformation
transmission
conduction
convection
current
wave

Subobjectives/Activities

Subobjectives:
A. Identify situations in which energy transformation occurs.
B. Conduct experiments showing one kind of energy transformed into another form.
C. Identify means of conduction of each energy form.
D. Describe evidence of convection currents in air and in liquids.
E. Investigate energy transfer through matter in the form of waves.

Activities:
1. Demonstrate energy transformation in several situations.
   Examples: boiling water on the stove.
   energy givers - pan, stove.
   energy receivers - pan, water.

2. Transfer of energy through or along an object is called conduction. List conductors of electricity, heat, light, sound.
3. Demonstrate examples of convection currents in the air and in liquids.
   a. Hold spiral paper over a warm light bulb.
   b. Hit two erasers above an overhead projector and watch the chalk dust.

Materials

TEXTBOOKS

STEM, Level 6, Units 1 & 5

MAPS, Level 8,
Chapters 10, 11, 12, 14

Accent on Science,
Level 5, Unit 7

Science, Level 5, Unit 4
Clusters A-1, A-2

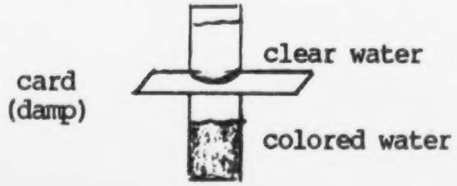
CAPTIONED FILMS
F772 Energy: A First Film

OTHER MATERIALS
SAVI Science KIT: Environmental Energy

c. Fill two matching glass jars with water. Add 10 drops of food coloring to one of the jars.

Wet a file card with water. Set it on top of the jar with clear water. Hold the card tightly, tip the jar upside down, and place it on top of the other jar.

Remove the card carefully and observe what happens.



G07 Identify and describe sudden changes in geographical features of the land.

UNIT TOPIC: Sudden Changes in the Land

ESTIMATED DURATION
2 weeks

Vocabulary

volcano
ash
lava
crust
core
layer
mantle
earthquake
Richter scale
wave
flood
sudden
change
seismograph

Subobjectives/Activities

Subobjectives

- A. Explain how volcanoes are formed and describe how they change the land.
- B. Explain how earthquakes are produced and describe how they change the land.
- C. Explain some causes of flooding and describe how flooding changes the land.

Activities:

1. Research volcanoes, earthquakes and floods. Write a report.

2. Make a cross-section of a volcano from clay or paper mache'.

3. Make a volcano from paper mache'. To make it explode, mix vinegar with red food coloring and add baking soda.

4. View movies or filmstrips about volcanoes, earthquakes and floods.

5. Construct a model of a section of the earth's crust. Demonstrate faults and earthquakes.

6. Build a model seismograph.

7. Collect pictures showing scenes following a volcano, earthquake or flood. Write a description of how the land was changed.

8. Check the Guiness Book of World Records for information on the world's most serious volcano eruption, earthquake, or flood. Write a report about it.

Materials

TEXTBOOKS
Science, Level 4,
Unit 1, Cluster C-2;
Level 6, Unit 2, Cluster C-3

STEM, Level 6, Unit 7

Accent on Science, Level 5, Unit 8

S.F. Science, Level 4,
Unit 3, Chapter 6

CAPTIONED FILMS

F525	The Earth: Volcanoes
F603	Earth: Man's Home
F655	Your Environment Is the Earth

FILMSTRIPS
Earthquakes (WR)
Earthquakes (PH)
Flood! (SVE)
Earthquake! (SVE)
Earthquakes and Volcanoes (NG)
The Story of Volcanoes (EB)

290

G07 Identify and describe sudden changes in geographical features of the land (materials, continued).

BOOKS

Zim, Herbert, What's Inside the Earth
Thompson, B., & Overbeck, C., Volcanoes
Thompson, Brenda, Volcanoes
May, Julian, Why the Earth Quakes
Radlauer, Ruth, Volcanoes
Branley, Franklyn, Volcanoes
Updegraff, Robert & Imelda,
    Earthquakes and Volcanoes
Fradin, Dennis, Disaster! Earthquakes

OTHER MATERIALS

Study Prints: Volcanoes
Earth Science (duplicating masters)
National Geographic Kits:
    A Look at the Earth Around Us: Mountains
    Earthquakes and Volcanoes

G08 Describe changes in land over time.

UNIT TOPIC: Erosion and Weathering

ESTIMATED DURATION
3 weeks

Vocabulary

erosion
cape
basin
valley
beach
glacier
weathering

Subobjectives/Activities

Subobjectives

A. Identify some common causes of erosion: wind, water, heat, ice, human activity.
B. Identify some effects of erosion.
C. Identify geological changes: capes, valleys, canyons, etc. Explain how erosion caused them.
D. Identify ways to prevent soil erosion.
E. Describe how the glaciers changed the landscape.
F. Describe the effects of weathering on the land.

Activities

1. Define erosion and brainstorm a list of its causes.

2. Find pictures in National Geographic that show erosion. Infer the causes of the erosion in the pictures.

3. Look for soil erosion around your school.

4. Experiment: Put different kinds of rocks in a jar of water. Shake the jar for a few minutes each day. Note any changes in the rocks.

5. Experiment: Cut three plastic milk cartons in half. Fill the bottom half of each with soil. Prop one side of each on a slight angle. Add sticks and leaves or grass to one, leaves in the second, and nothing to the third. Predict which carton will show the greatest soil loss (erosion). Then pour water over the containers and compare. Discuss ways to stop erosion of the soil.

Materials

TEXTBOOKS

Science, Level 4,
Unit 1, Clusters B-2, C-1

STEM, Level 4, Unit 1;
Level 6, Unit 7

Accent on Science,
Level 5, Unit 8

S.F. Science, Level 4,
Unit 4, Chapters 7 & 8

CAPTIONED FILMS

F603	Earth: Man's Home
F655	Your Environment Is the Earth
F1089	Time Changes the Land
F1055	Erosion and Weathering: Looking at the Land
F9	Face of the Earth

BOOKS

Clifford, E., The Wind Has Scratchy Fingers
Tangborn, Wendell, Glaciers
Lauber, Patricia, Icebergs & Glaciers

6. Research and report on a landform: a cape, basin, canyon, valley, or beach. Tell how erosion caused its formation.

7. Build a "mountain" of dirt, mud, and clay. Use a hose to trickle water over the top (like melting snow). Show how the water can erode the mountain.

OTHER MATERIALS

Slide sets:
  Erosion
  Effects of Running Water
  Effects of Wind
  Effects of Snow and Ice
Study Prints:
  Erosion
National Geographic kits:
  A Look at the Earth Around Us: Rivers
  " " Mountains
Duplicating masters:
  Earth Science

PA22 Investigate how plants are grouped.

UNIT TOPIC: Grouping Plants

ESTIMATED DURATION
3-4 weeks

Vocabulary

conifer
cone
flower
fern
moss
mold
fungi
mushroom
spore
bacteria
reproduction
monocots
vascular
non-vascular

Subobjectives/Activities

Subobjectives:

A. Describe the two major kinds of seed producing plants (those bearing cones and those that produce flowers).
B. Name and describe common plants that do not produce seeds (ferns, mosses, molds, mushrooms, and seaweed).
C. State the functions of spores in non-flowering plants.
D. Identify the parts of a seed and their functions.
E. Identify and classify fungi, mold, and bacteria as non-green plants.
F. Describe the characteristics of non-green plants and their means of reproduction.

Activities:

1. Make a collection of cones. Find out the names of the trees they came from.

2. Make a terrarium of non-seed-producing plants such as mosses and ferns.

3. Look at spores under a microscope.

4. Label the parts of a seed and explain their functions.

5. Grow your own bacteria in a jar of dried grass and rain water. (Look at bacteria under a microscope.)

6. Observe and compare different kinds of mold growing on foods.

Materials

TEXTBOOKS

Accent on Science
Level 5, Unit 9

STEM, Level 5, Unit 2

S.F *Science*,
Level 5, Unit 1

BOOKS

Elin, Herbert, *Atlas of Plant Life*
Laulfield, Peggy, *Leaves*
Morton, Julia, *Exotic Plants*
Cavana, Betty,
The First Book of Wildflowers
Hutchins, Ruth, *This Is a Flower*
Lemmon, Robert,
Jr. Science Book of Trees
Symonds, George,
Tree Identification Book

7. Make a diagram showing how non-green plants reproduce.
8. Predict how fast bread will mold. Put a piece of bread in a plastic bag. Find out if a wet piece of bread will mold faster than a dry one.
9. Make bread with yeast. Discuss how fungi can help people.

OTHER MATERIALS

Kinds of Plants and How They Grow
A Look at Plants
Exploring Our Environment

Slides:
  Carnivorous Plants
  Weeds and Wayside Plants

PA23 Identify some protists and explain why they are important.

UNIT TOPIC: Introduction to Protists

ESTIMATED DURATION
1-2 weeks

Vocabulary

protist
virus
bacteria
algae
protozoa
fungi
lichen

Subobjective/Activities

Subobectives

A. Identify organisms as plants, animals or protists.
B. List some characteristics of protists.
C. Classify protists as viruses, bacteria, protozoa, fungi, or algae.
D. Explain why protists are important in our environment.

Activities:

1. Observe some protists under a microscope.

2. Collect samples of pond water and look for living things under a microscope.

3. Take a field trip to observe different kinds of fungi, algae and lichens.

4. Observe how protists can change bread. Place a piece of bread on a dish. Wet it slightly and cover the dish. Store it in a warm, dark place. Wash your hands after handling the bread. Use a hand lens to observe the bread daily; record any changes you observe.

Materials

TEXTBOOK
Accent on Science,
Level 6, Unit 1

CAPTIONED FILMS
MF 40 Paramecium, Euglena, and Amoeba
MF73 Single-Celled Animals: Protozoa

BOOKS

White, William, The Edge of the Pond
Sutherland, Louis, Magic Bullets
May, Julian, The First Living Things
Pinney, Roy, Collecting and Photographing Your MicroZoo
Slaton, William & Nellie, Bacteria and Viruses
Asimov, Isaac, How Did We Find Out About Germs?
Lietz, Gerald, Bacteria
Lindemann, Edward, Some Animals Are Very Small

HSN09 Identify common diseases and their treatment.

UNIT TOPIC: Diseases and Their Treatments

ESTIMATED DURATION
1 week

Vocabulary

measles
mumps
chicken pox
virus
germs
bacteria
fever
headache
upset stomach
diarrhea
vaccination
food poisoning
temperature
thermometer
flu

Subobjectives/Activities

Subobjectives:

A. Identify childhood illnesses and their symptoms.
B. Discuss treatment for the common cold.
C. Recognize when and how to call the doctor, and what facts to have ready.
D. Identify ways to take body temperature both internally and externally.
E. Recognize symptoms of food poisoning and ways to treat it.
F. Identify how rabies is transmitted and what to do in case of an animal bite.

Activities:

1. Have a doctor or school nurse discuss the causes and treatment of common diseases.

2. Take your body temperature and read the thermometer.

3. Discuss ways to prevent food poisoning. Identify symptoms and explain ways to treat it.

4. Write a report on rabies or another disease.

Materials

TEXTBOOK
Your Health and You, Level 3

CAPTIONED FILMS
F836 Germs and Your Body
F843 How to Catch a Cold

BOOK
LeMaster, Leslie Jean, Bacteria and Viruses

OTHER MATERIALS
The Sickle Cell Learning Game

FIELD TRIP
Armed Forces Medical Museum

PM09 Identify the properties and structure of matter.

UNIT TOPIC: Properties of Matter

ESTIMATED DURATION
2 weeks

Vocabulary

property
chemical
physical
atom
element
symbol
matter
compound
mixture
solution

Subobjective/Activities

Subobjectives:
A. Identify chemical and physical properties of a substance.
B. Explain that all matter is made up of atoms.
C. Name several elements and their properties.
D. Identify the chemical symbols for common elements.
E. Observe chemical and physical changes in matter.
F. Compare and contrast elements and compounds.
G. Compare mixtures and solutions.

Activities:
1. Find elements on a periodic table.

2. Match elements to their symbols.

3. Design and carry out a plan to separate a mixture.

4. Observe chemical and physical reactions.

Materials

TEXTBOOKS

Accent on Science,
Level 6, Unit 2

PM10 Identify and classify different types of compounds.

UNIT TOPIC: Introduction to Compounds.

ESTIMATED DURATION
1 week

Vocabulary

compound
acid
base
salt
organic compound
carbon

Subobjective/Activities

Subobjectives

A. Classify different types of compounds.
B. Describe some compounds as salts.
C. Describe the properties of acids and bases.
D. Identify some organic compounds.

Activities

1. Classify substances as either acid or base (vinegar, lemon juice, liquid detergent, baking soda, distilled water), using litmus paper.

2. Discuss how salt is used: to flavor food, melt snow, make ice cream.

3. Classify compounds as organic or inorganic based on their chemical symbols.

Materials

TEXTBOOKS

Accent on Science, Level 6, Unit 3

E09 Identify Energy resources and the need for conservation.

UNIT TOPIC: Conserving Energy

ESTIMATED DURATION
1 week

Vocabulary

energy
fossil fuel
conserve
acid rain
refinery
strip mining
oil reserves
atomic
fission
fussion
geothermal
geysers
nuclear reactors
solar energy
tidal energy

Subobjectives/Activities

Subobjectives:

A. Identify a variety of fossil fuels.
B. Explain how fossil fuels form and how they are used.
C. Explain problems associated with the use of fossil fuels.
D. Identify and compare energy alternatives: wind, water, tidal, geothermal, nuclear, solar.

Activities:

1. Point out that the U.S. has six percent of the world's population, but uses one-third of the world's energy supply. Discuss how this energy consumption might cause worldwide problems.

2. Make posters telling people how they can conserve energy in daily life.

3. Design an experiment to show how acid rain affects plants.

4. Visit a local power company, nuclear power facility, windmill, dam, or other energy source.

Materials

TEXTBOOKS
Accent on Science, Level 6, Unit 4

CAPTIONED FILMS
MF77 Toast
F1530 Nuclear Energy: The Question Before Us

OTHER MATERIALS
Saving Energy (Nat. Geo. Kit)
SAVI Science Kit: Environmental Energy

FIELD TRIPS
Nuclear power plant

HGR07 Identify and describe three basic body systems that supply food, oxygen, and water to the cells of your body.

UNIT TOPIC: **Body Systems II**

ESTIMATED DURATION
3-4 weeks

Vocabulary

system
digestive system
circulatory system
respiratory system
organ
blood
blood vessels
heart
lungs
oxygen
carbon dioxide
nose
mouth
breath
teeth
tongue
esophagus
stomach
intestine

Subobjectives/Activities

Subobjectives

A. Identify organs of the digestive system and describe the process of digestion.
B. Identify organs of the respiratory system and describe the process of respiration.
C. Describe the organs of the circulatory system and describe the process of circulation.

Activities

1. Trace the path of food through the digestive system.
2. Label the organs of the digestive system. Match each part of the system to its function.
3. Trace the path of air through the lungs.
4. Label the organs of the respiratory system. Match each part of the system to its function.
5. Look at pictures of healthy and diseased lungs.
6. Find and compare students' respiration rates.
7. See which students can hold their breath the longest.
8. Take resting pulses, then exercise and compare.
9. Look at pictures of normal and diseased hearts.

Materials

TEXTBOOKS

Science, Level 5,
Unit 1, Cluster B-1

Accent on Science, Level 4, Unit 1

Stem, Level 4, Unit 6

S.F. Science, Level 6, Unit 3

CAPTIONED FILMS

F132 Heart and Circulation
F274 How Your Blood Circulates
F391 About the Human Body
F470 Our Wonderful Body: The Heart and Its Work
F472 Our Wonderful Body: How We Breathe
F473 Our Wonderful Body: How Its Parts Work Together
F820 Blood and Circulation
F829 Digestion and the Food We Eat
F932 Man: The Incredible Machine
F1377 The Heart: An Inside Story

BOOKS

Schneider, Led, Lifeline: The Story of Your Circulatory System
Goldsmith, Ilse, Anatomy for Children

HGR07 Identify and describe three basic body systems that supply food, oxygen, and water to the cells of your body (continued).

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10. Trace the path of blood through the heart into the lungs and throughout the body.

11. Match each part of the circulatory system and its function.

FILMSTRIPS

The Heart and Circulation (EB)
You--The Living Machine (WD)
The Circulatory System (EB)
The Respiratory System (EB)
The Digestive System (EB)

OTHER MATERIALS

The Human Body: Systems for
    Maintaining Life (study prints)
Circulation Game
Systems of the Human Body
The Visible Woman
The Human Body
Learning About Your Body
Human Body Systems
Inside Me (body system picture)

A09 Explore new discoveries and theories about space.

UNIT TOPIC: Exploring Space

ESTIMATED DURATION
2-5 days

Vocabulary

space
universe
stars
nova
supernova
theory
exploration
telescope

Subobjectives/Activities

Subobjectives:

A. Compare the size of Earth and the universe.
B. Discuss special stars: novas, supernovas, pulsars, and black holes.
C. Discuss the big bang and pulsating theories of the universe.
D. Discuss the U.S. space exploration program.

Activities

1. Have students draw their concepts of space and the universe. Compare their drawings with actual space photos.

2. Plan an evening to observe the night sky.

3. Visit a planetarium or telescope.

4. Discuss theories and possibilities for life elsewhere in the universe.

5. Build and launch a model rocket.

6. Prepare a timeline showing major space-age events from 1957 to the present.

Materials

TEXTBOOKS

Accent on Science,
Level 6, Unit 6

FIELD TRIPS
Air and Space Museum
Naval Observatory
Planetarium
Maryland Science Center Planetarium
NASA (Greenbelt, MD)

PA24 Identify and describe some ecosystems.

UNIT TOPIC: Ecosystems

ESTIMATED DURATION
1 week (with PA25)

Vocabulary

ecosystem
carbon-dioxide
cycle
nitrogen
producer
consumer
scavenger
decomposer
biome

Subobjective/Activities

Subobjectives:

A. Define an ecosystem.
B. Describe some cycles in ecosystems: water cycle, carbon-dioxide/oxygen cycle, and nitrogen cycle.
C. Define and identify producers and consumers.
D. Identify and describe seven large ecosystems (or biomes): tundra, taiga, grassland, tropical rain forest, temperate forest, desert, aquatic.

Activities:

1. Observe the living and non-living parts of a lawn ecosystem. Discuss how they affect each other.
2. Draw the cycles in an ecosystem.
3. Leave a piece of raw meat or an apple outside for up to five days. Observe the evidence of decomposers and consumers, and record your observations.
4. Study the ecology of a pond, forest, lawn, aquarium, or terrarium. Write a report.

Materials

TEXTBOOK

Accent on Science
Level 6, Unit 7

PA25 Identify, describe, and compare communities of living things.

UNIT TOPIC: Communities of Living Things

ESTIMATED DURATION
2-3 weeks (with PA 24)

Vocabulary

population
community
relationship
competition
predator
prey
parasite
host
cooperation
commensal
mutualism
extinct
endangered
forest
desert
jungle
tundra
farm
pond

Subobjectives/Activities

Subobjectives:

A. Define population and community.
Identify and describe different communities of living things (forest, desert, jungle, tundra, ocean, city, farm, pond, or vacant lot).
B. Describe predator/prey relationships among organisms.
C. Describe parasite/host relationships among organisms.
D. Define these terms: cooperation, commensal relationships, mutualistic relationships.
E. Identify helpful and harmful interactions in communities.
F. Differentiate between extinct and endangered species.

Activities:

1. Dig up a small piece of lawn, about 8 cm. deep. Put it in a paper bag and bring it to class. Compare the plants and animals you find in your soil sample with the plants and animals found in the soil samples of your classmates.

   Make a chart listing the plants and animals you find.

2. Visit one of the following communities to observe the kinds of plants or animals living there: vacant lot, pond, tundra, desert, forest, jungle, ocean, city, farm. Keep a record of what you find.

3. Classify helpful and harmful interactions in communities such as: people planting seeds
   chldren and poison ivy
   cat eating a mouse
   mice eating corn
   mold growing on bread

4. Set up a terrarium for crickets. Find out what they eat and how they interact. Record the population growth. What variables affect the population growth?

5. Study populations of bees, ants, wolves, or humans. Write a report to present to the class.

Materials

TEXTBOOKS
Stem, Level 3, Unit 8
Accent on Science,
Level 3, Unit 5
S.F. Science, Level 2, Unit 8
Level 4, Unit 8
Science, Level 3, Unit 4
Level 4, Unit 1

CAPTIONED FILMS

F606	Ecology: Community Beneath the Sea
F738	The Coral Jungle
F101	Bird Homes
F957	The Stream
F926	Life in a Pond
F963	A Visit to a Pond
F459	Winter Comes to the Forest
F594	Animals of the Desert
F189	Animal Habitats
F1102	Wolf Pack
F1091	The Tree

OTHER MATERIALS
National Geographic Kits:
Life in a Pond
Kinds of Plants & Where They Grow
Life in the Woods
Duplicating Masters: Friends of Field, Stream, and Forest

HGR08 Identify and describe the four stages of human development: infant, child, teenager, adult.

UNIT TOPIC: Stages of Development

ESTIMATED DURATION
2-3 weeks

Vocabulary

- stage
- infant
- child
- teenager
- adolescent
- adult

Subobjectives/Activities

Subobjectives

A. Sequence stages in human growth and development.
B. Classify people according to stages of development.
C. Identify one's own stage of development.
D. Describe previous stages of own development.
E. Identify the basic external physical changes that occur during stages of development.

Activities

1. Ask students to bring in baby pictures. Have the class try to guess who each baby is.

2. Cut pictures of infants, children, teenagers, and adults from magazines. Name appropriate stages.

3. Have students identfy their current stages of development. Compare to younger stages. How have you changed? How are you the same as before?

4. Make a chart of external physical changes that happen at each stage of development. For instance:

Infancy	Childhood	Adolescence	Adulthood
new teeth	grow taller	girls develop breasts	growth slows
start to walk	permanent teeth	boys' voices deepen	mature figure
start to talk	go to school	body hair grows	gray hair
fast growth		menstruation begins	

Materials

CAPTIONED FILMS

F229	Boy to Man
F784	Naturally...a Girl
F427	Fertilization and Birth
F1156	Now I Am Bigger
F3946	Living and Growing

FILMSTRIP
Into Manhood/Into Womanhood

VIDEOTAPE
Look at You Now (changes from infancy into childhood)

BOOKS
DeSchweintz, Karl, Growing Up
Edens, David, The Changing Me
Lerrigo, Marion, What's Happening to Me?

HGR09 Investigate the male and female reproductive systems.

UNIT TOPIC: **Reproduction**

ESTIMATED DURATION
3-4 weeks

Vocabulary

breast
vagina
cervix
fallopian tube
ovary
menstruation
pubic hair
penis
urethra
testes
scrotum
vas deferens
sperm cells
ovum
seminal vesicles
ejaculation
semen

Subobjectives/Activities

Subobjectives

A. Locate the male reproductive organs and describe their functions.
B. Locate the female reproductive organs and describe their functions.
C. Describe the process and functions of menstruation.
D. Discuss changes in male and female behavior during development.
E. Discuss appropriate social behavior with people of the opposite sex.

Activities

1. Label male and female reproductive organs. Match each part of the reproductive system to its function.

2. Trace the path of an egg from each ovary to the uterus.

3. Trace the path of sperm from the testicles to the penis.

4. Explain the process of menstruation and basic feminine hygiene.

5. Discuss changes in male and female sexual behavior: masturbation, erection, ejaculations, wet dreams, orgasms.

6. Identify appropriate social behavior with the opposite sex.

Materials

CAPTIONED FILMS
KSF85 Girl to Woman
K229 Boy to Man

FILMSTRIP
The Reproductive System (EB)

OTHER MATERIALS
Human Body: Systems for Maintaining Life (study prints)
The Visible Woman
See librarian for special collection.

PA26 Identify factors that are helpful and harmful to the environment.

UNIT TOPIC: Conserving Our Environment

ESTIMATED DURATION
2-3 weeks

Vocabulary

helpful
harmful
pollution
over-population
endangered
refuse
waste
litter
disposable
recycle
landfill
biodegradeable
acid rain

Subobjectives/Activities

Subobjectives:

A. Identify helpful factors in an environment (earthworms aerating the soil, bees making honey, cows fertilizing pasture, etc).
B. Identify causes of overpopulation; describe its effects.
C. Classify types of pollution.
D. Identify causes of pollution and describe the effects of different kinds.
E. Identify endangered plant and animal species and tell why they are endangered.
F. Discuss ways to conserve the environment.

Activities:

1. Find out the human population of the Earth. Which countries have the highest and lowest populations?

2. Experiment with a population of crickets, mealworms, fruit flies or guppies. What are some factors that increase the population; decrease the population?

3. Interpret graphs to tell if a population is increasing, decreasing or stable over a period of time.

4. Research and report on different types of pollution and how they affect plant and animal populations.

Materials

TEXTBOOKS

S.F. Science,
Level 6, Unit 1

Science, Level 6, Unit 1

Stem, Level 6, Units 8, 9

CAPTIONED FILMS

MF31	Cry of the Marsh
F1054	Endangered Animals: Will They Survive?
F145	Insect Enemies and Their Control
F605	The Ecology of the Swamp
F606	Ecology: Community Beneath the Sea
F832	Econoly: Checks and Balances
F607	Ecomega
F614	From the Face of the Earth
F635	Once Upon a Wilderness
F655	Your Environment is the Earth
F786	Termites: Architects of the Underground

FILMSTRIPS

Pollution of the Atmosphere (HMS)
Pollution of the Waters (HMS)
Pollution Series (CF)
Nothing to Do (LPP)

BOOK

Farb, Peter, Ecology

PA26 Identify factors that are helpful and harmful to the environment (materials, continued)

|OTHER MATERIALS|

Study Prints
    Endangered Species: Mammals
    Endangered Species: Birds
    Ecology: The Pollution Problem
    Water
People and the Earth's Resources
    (duplicating masters)
Problems of Pollution
    (duplicating masters)
Pollution
Ecology Activity Cards
Ecology Energy Action Pack
Wildlife Alert: The Struggle to Survive

|FIELD TRIPS|

Chesapeake Bay (MD)
    Center for Environmental Studies
Natural history museum
Waste water treatment plant

MIDDLE SCHOOL CURRICULA

Life Science	190
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MIDDLE SCHOOL DEPARTMENT

Level 7: Life Science Course

PLANTS & ANIMALS

PA27	Investigating Organisms
PA28	Methods of Science
PA29	The Cell
PA30	The Invertebrate Phylum
PA31	The Phylum Chordata
PA32	Cells, Tissues, Organs & Systems of Animals
PA33	Animal Reproduction
PA34	Kinds of Plants
PA35	Plants—Structures & Functions
PA36	Plant Reproduction
PA37	Protists
PA38	Fungi & Monerans
PA39	Organisms Change Over Time
PA40	Careers in Biology, Zoology

HUMAN GROWTH & REPRODUCTION

HGR10	The Skeletal System
HGR11	The Respiratory System
HGR12	The Digestive System & Excretion
HGR13	The Circulatory System
HGR14	The Nervous & Endocrine Systems
HGR15	The Sense Organs
HGR16	The Reproductive System
HGR17	Pregnancy
HGR18	Heredity
HGR19	Careers in Medicine

HEALTH, SAFETY, & NUTRITION

HSN10	Nutrition
HSN11	Diseases & Treatments
HSN12	Substance Abuse
HSN13	Careers in Health, Safety, & Nutrition

SOUND & HEARING

S08	Investigating Sound Energy
S09	Deafness & Communication
S10	New Ways to Help the Hearing Impaired
S11	Careers in Education of Deaf Students & Related Areas

PA27 Identify characteristics and activities of living organisms.

UNIT TOPIC: Investigating Organisms

ESTIMATED DURATION
2 weeks

Vocabulary

organism
life span
reproduction
energy
oxygen

Subobjectives/Activities

Subobjectives:

A. Review the characteristics of living things.
B. Explain why reproduction is needed for life to continue to exist.
C. Explain how living things get energy.
D. Explain how organisms use oxygen to obtain food.
E. Explain why water is important to all living organisms.
F. Identify some theories of the origin of life on earth.

Activities:

1. Students list the characteristics of living things, then compare the lists and make one common list.

2. List one way you get energy.

3. Report on how people use oxygen to obtain food.

4. Find out how long people can live without food; without water.

5. Discuss theories related to the origins of life on earth.

6. Make a terrarium. Demonstrate what living things need for proper growth.

Materials

TEXTBOOKS

Focus on Life Science, Unit 1

S.F. Life Science, Unit 1

CAPTIONED FILM

F927 Life Span: How Long Do We Live and Why?

OTHER MATERIALS

SAVI Science Kit: Environments

341

342

PA28 Describe how scientists use classification, measurement, and scientific method to solve problems.

UNIT TOPIC: The Methods of Science

ESTIMATED DURATION
3-4 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
scientific method classify experiment kingdom moneran protist fungi plants animals phyla class order family genus species problem materials procedure discussion results conclusion	Subobjectives: A. Explain the components of the scientific method. B. Explain how things are classified. C. Identify and describe the main features of the five kingdoms. D. Explain how organisms are given scientific names. Give examples of scientific names. E. Identify ways scientific solve problems using the scientific method. F. Identify the parts of an experiment. G. Identify the most frequently used units of the metric system. Activities: 1. Bring various kinds of keys and field guides to class. 2. Give each student a variety of seeds to classify into some kind of scheme. Compare students' classification methods. 3. Make a chart listing general characteristics of each of the five kingdoms. Give examples of organisms in each kingdom. Where are humans? 4. Classify humans according to kingdom, phylum, class, order, family, genus, and species. 5. Visit a zoo or arboretum. Identify at least 20 different kinds of organisms. Find out their common and scientific names.	SAVI Science Kit: Scientific Reasoning module

6. Demonstrate how to solve a problem through scientific methods.

7. Identify controls and variables in an experiment.

8. Match the parts of an experiment with the questions they ask.

9. Select the appropriate metric units for measuring length, volume, mass, and temperature.

PA29 Identify the basic parts of a cell and describe their activites.
Explain how a microscope is used to study cells.

UNIT TOPIC: The Cell

ESTIMATED DURATION
2-3 weeks

Vocabulary

microscope
eye piece
body tube
arm
high/low power objectives
coarse/fine adjustments
stage clip
stage
diaphragm
mirror
base
cell membrane
protoplasm
cytoplasm
nucleus
diffusion
osmosis
active transport
enzyme
mitosis
meiosis
tissue
organ
system

Subobjectives/Activities

Subobjectives:

A. Name the parts of a microscope. Give the function and location of each part.
B. Demonstrate the proper use of a microscope.
C. Describe the structure of a cell.
D. Identify the parts of a cell.
E. Differentiate between the processes of diffusion, osmosis, and active transport.
F. Explain how enzymes function in cells.
G. Explain the process of cell division (mitosis and meiosis).
H. Define the terms tissue, organ, and system and give examples of each.

Activities:

1. Label microscope parts and explain their functions.

2. Use the microscope to observe a variety of objects and organisms.

3. Label the parts of a cell on a diagram.

4. Look at a variety of cells under the microscope.

5. Demonstrate the processes of diffusion, osmosis, and active transport.

6. Draw cells in the process of mitosis.

Materials

TEXTBOOKS

Focus on Life Science, Unit 1

S.F. Life Science, Unit 1

CAPTIONED FILMS
F707 The Nature of Life: The Living Cell
F1653 The Biological Sciences: Cell Biology
KSF88 The Microscope

FILMSTRIP Cell Nutrition (EGH)

BOOKS
Moellring, F.K.,
Beginning with the Microscope
Silverstein, Alvin,
Cells: Building Blocks of Life
Simon, Seymour,
Exploring with a Microscope
LeMaster, Leslie J., Cells and Tissues

PA30 Identify and describe the characteristics of animals classified in the invertebrate phyla.

UNIT TOPIC: The Invertebrate Phyla

ESTIMATED DURATION
3-4 weeks

Vocabulary

invertebrate
phylum
sponge
coelenterata phylum
parasite
earthworm
mollusca
arthropod
insect
echinoderm

Subobjectives/Activities

Subobjectives:

A. Describe the characteristics of invertebrates.
B. Describe the features of a sponge.
C. Identify and describe members of the coelenterata phylum.
D. Define a parasite and give an example.
E. Describe the characteristics of flat worms, round worms, and segmented worms.
F. Identify and describe members of the mollusca phylum.
G. Describe the main characteristics of arthropods.
I. Identify the main parts of an insect.
J. Describe the main features of echinoderms.

Activities

1. Examine and describe natural and artificial sponges.

2. List all arthropods used as food for people.

3. Visit an extermination company to learn what it does. What insects do they find most harmful? Write a report.

4. Find out which insects cause the biggest problems for farmers and gardeners.

5. Build an ant farm; observe how ants interact in a colony.

6. Visit an aquarium. List all the invertebrates you see.

7. Research and report on how pearls are formed.

Materials

TEXTBOOKS
S.F. Life Science, Unit 3

Focus on Life Science, Unit 2

CAPTIONED FILMS
MF63 Parasitism
MF44 The First Many-Celled Animals: Sponges

BOOKS
Zim, Herbert, Seashore
Free, John, Life Under Stones
The Lives of Animals with Shells
Victor, Joan B., Shells are Skeletons
Bason, Lillian, Spiders
Hogner, Dorothy C., Spiders
Selsam, Millicent, and Joyce Hunt A First Look at Spiders

FIELD TRIPS
Zoo, Aquarium
Audubon Naturalist Society
Center for Environmental Studies

PA30 Identify and describe the characteristics of animals classified in the invertebrate phyla (continued).

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8. Observe an earthworm with a hand lens. Describe its movements.
9. Make a collection of shells. Learn the characteristics of each species in your collection.
10. Observe a hydra under a microscope.

PA31 Identify and describe the characteristics of animals classified in the phylum chordata.

UNIT TOPIC: The Phylum Chordata

ESTIMATED DURATION
3-4 weeks

Vocabulary

Chordata
phylum
cold-blooded
warm-blooded
amphibian
reptile
mammal
fish
bird

Subobjectives/Activities

Subobjectives:

A. Describe the characteristics of animals classified in the phylum chordata.
B. Identify characteristics of the three classes of fish. Give examples of each class.
C. Describe the stages in the development of an amphibian.
D. Identify the main characteristics of reptiles.
E. Identify the common characteristics of birds.
F. Identify the main features of mammals.
G. Classify animals in the phylum chordata according to their characteristics.

Activities

1. Set up and maintain and aquarium.

2. Observe a salamander (or snake, rodent, fish, bird) in the classroom.

3. Go on a bird watching trip.

4. Go fishing and classify the kinds of fish you catch.

5. Have a contest. See how many mammals you can list in 10 minutes. Compare your lists.

6. Collect vertebrae of various animals from a local butcher or supermarket. Compare them.

Materials

TEXTBOOKS
Focus on Life Science, Unit 2

S.F. Life Science, Unit 3

CAPTIONED FILMS

F86	Amphibians: Frogs, Toads, and Salamanders
F162	Mammals Are Interesting
F558	Mammals and Milk
F568	Snakes and How They Live
F982	Introduction to Reptiles

BOOKS
Carrington, Richard, The Mammals
Ommanney, F., The Fish
Ballard, Lois, True Book of Reptiles
Hornblow, Leonora, Reptiles Do the Strangest Things
Zim, Herbert, Birds
Boorer, Michael, Life of Strange Mammals
Teevan, Helen, Small Mammals Are Where You Find Them

FILMSTRIPS
Finding Out About Mammals
Reptiles & Amphibians

FIELD TRIPS
Zoo, Aquarium

PA32 Describe how cells, tissues, organs, and systems work to keep an animal alive.

UNIT TOPIC: Cells, Tissues, Organs, and Systems of Animals

ESTIMATED DURATION
3-4 weeks

Vocabulary

- skeletal system
- digestive system
- circulation system
- sensory organ
- inborn
- acquired

Subobjectives/Activities

Subobjectives:

A. Compare the skeletal structures of different animals (frogs, grasshoppers, earthworms).
B. Compare the digestive systems of different animals.
C. Compare the respiratory systems of different animals (frogs, grasshoppers, earthworms, fish).
D. Compare the circulatory systems of different animals.
E. Compare the sensory organs of different animals.
F. Differentiate between inborn and acquired behavior.

Actvities:

1. Dissect the following animals; frog, grasshopper, earthworm, fish. Compare their body systems.

2. Find out how bats fly. Write a report.

3. Experiment to see if you can train a goldfish. Train the fish to come to the surface of the water when a light is flashed. Then feed the fish. Write up your experiment.

4. Make a list of inborn behaviors, and another list of acquired behaviors.

Materials

TEXTBOOKS

Focus on Life Science, Unit 2

BOOKS

Nespojohn, Katherine, Animal Eyes
LeMaster, Leslie J. Cells and Tissues

PA33 Investigate how animals reproduce. Discuss the importance of reproduction to the survival of a species.

UNIT TOPIC: Animal Reproduction

ESTIMATED DURATION
2-3 weeks

Vocabulary

sexual
asexual
reproduction
regeneration
external fertilization
metamorphosis
estrous cycle
embryo
colostrum

Subobjectives/Activities

Subobjectives:

A. Explain the difference between sexual and asexual reproduction.
B. Define regeneration and give two examples.
C. Describe the general process of sexual reproduction in animals.
D. Describe external fertilization and give examples of animals that reproduce by external fertilization.
E. Define metamorphosis and distinguish between complete and incomplete metamorphosis.
F. Define internal fertilization and give examples of animals that reproduce by internal fertilization.
G. Describe the estrous cycle in female mammals.
H. Describe the stages of embryo development. Explain how an embryo obtains food and oxygen and gets rid of waste.
I. Explain why colostrum and milk are important in the reproduction of mammals.

Activities:

1. Classify animals that reproduce sexually or asexually.

2. Identify animals that can regenerate body parts, such as earthworms, starfish, lizards, snakes, crabs. Find out whether people can regenerate destroyed tissue.

3. Classify animals that reproduce by external or internal fertilization.

Materials

TEXTBOOK

Focus on Life Science, Unit 2

CAPTIONED FILMS

F255	Biography of the Unborn
F427	Fertilization and Birth
F593	Animal Reproduction
F597	Birth of Puppies

33 Investigate how animals reproduce. Discuss the importance of reproduction to the survival of a species (continued).

4. Observe and describe the metamorphosis of a frog, beetle, butterfly, or other organism.

5. Make a chart showing the gestation periods of different animal species.

6. Research and report on artificial insemination and superovulation in cows.

PA34 Identify the characteristics of different kinds of plants and tell how plants are classified.

UNIT TOPIC: Kinds of Plants

ESTIMATED DURATION
2-3 weeks

Vocabulary

vascular
non-vascular
algae
liverwort
moss
ferns
gymnosperm
angiosperm

Subobjectives/Activities

Subobjectives:

A. Describe the difference between vascular and nonvascular plants.
B. Explain how plants are classified.
C. Define algae and name three kinds of algae classified as plants.
D. Describe the main features of liverworts and mosses.
E. Explain how ferns differ from mosses and liverworts.
F. Identify and distinguish between two groups of seed plants: gymnosperms and angiosperms.

Activities

1. Find out what kinds of plants grow around your school or house. List them by common and scientific names.

2. Bring samples of moss, ferns, liverworts to class and compare them.

3. Use a key to classify a variety of plants.

4. Classify seed plants as gymnosperms or angiosperms.

Materials

TEXTBOOKS

Focus on Life Science, Unit 3

S.F. Life Science, Unit 2

ESS, "Microgardening"

OTHER MATERIALS
Plants (duplicating masters)

FIELD TRIPS
Botanical gardens
Arboretum

PA35 Identify structures of plants and their functions.

UNIT TOPIC: **Plants--Structure and Function**

ESTIMATED DURATION
2-3 weeks

Vocabulary

roots
stem
leaves
minerals
herbaceous
xylem
phloem
cambium
stomate
transpiration
photosynthesis
tropism
auxin

Subobjectives/Activities

Subobjectives:

A. Identify the main parts of a seed plant (roots, stem, leaves).
B. Explain the structure and functions of roots.
C. Explain how plants obtain water and minerals from soil.
D. Explain differences between woody and herbaceous plants.
E. Explain the functions of xylem, phloem, abd cambium.
F. Identify the structure and functions of leaves.
G. Describe the changes that occur in photosynthesis.
H. Explain how energy is obtained in respiration.
I. Define tropism and auxin and give examples of each.

Activities

1. Label the main parts of a seed plant.

2. Research and report on how plants obtain minerals and water from the soil.

3. Label the parts of a leaf; observe under a microscope.

4. Draw a diagram of plant transpiration.

5. Design an experiment to show that plants need light. Experiment to see the effects of different colors of light on a plant.

6. Stand celery stalks in water containing food coloring. Observe what happens to the leaves.

7. Design an experiment to observe a tropism or auxin.

Materials

TEXTBOOKS
Focus on Life Science, Unit 3

S.F. Life Science, Unit 2

CAPTIONED FILM
KSF77 Green Plants Make Food

OTHER MATERIALS
SAVI Science Kit: Structures of Life

BOOK
Simmons, John, The Life of Plants

PA36 Investigate plant reproduction and the reproductive structures of seed plants.

UNIT TOPIC: Plant Reproduction

ESTIMATED DURATION
2-3 weeks

Vocabulary

- asexual reproduction
- pollination
- fertilization
- conifer
- moss
- liverwort
- ferns
- disperse
- pollen
- ovule
- anther
- stigma
- egg
- pollen nucleus
- ovary
- seed coat
- endosperm
- epicotyl
- hypocotyl
- cotyledon
- dicot
- monocot
- embryo

Subobjectives/Activities

Subobjectives:

A. Describe asexual reproduction in green algae.
B. Descrive reproduction of mosses, liverworts, and ferns.
C. Describe how pollination and fertilization occur in conifers.
D. Explain how seeds are formed in conifers.
E. Identify the parts of a flower and their functions.
F. Describe the processes of pollination and fertilization in a flowering plant.
G. Identify ways in which various factors aid pollination.
H. Explain the differences between seeds and fruits.
I. Identify the parts of a seed and their functions.
J. Describe ways seeds are dispersed from plants.
K. Demonstrate how to grow new plants from parts of another plant.

Activities

1. Dissect a flower, label the parts, and explain their functions.

2. Label the parts of a seed and explain their functions.

3. Grow plants from seeds, stems, roots, and leaves (use seeds, carrots, coleus, bulbs, etc.).

4. Identify ways to aid pollination (keeping beehives, etc.).

5. Investigate the many ways plants disperse seeds.

Materials

TEXTBOOKS
Focus on Life Science, Unit 3

S.F. Life Science, Unit 2

CAPTIONED FILMS
F178 Plant World
F220 Rice from Seed to Flower
F578 What Do Flowers Do?

OTHER MATERIALS
Plants (duplicating masters)
SAVI Science Kit: Structures of Life

PA36 Investigate plant reproduction and the reproductive structures of seed plants (continued).

6. Start a nut collection. Learn which trees the various nuts come from.
7. Plant the seeds of fruits you eat. Observe similarities and differences among the plants.
8. Research and report on various ways animals (bats, birds, bees, moths, etc.) help pollinate flowers.

PA37 Identify the characteristics of organisms in each phylum of the protist kingdom.

UNIT TOPIC: Protists

ESTIMATED DURATION
2-3 weeks

Vocabulary

protist
phyla

Subobjectives/Activities

Subobjectives:

A. Identify ways in which protists resemble plants and animals.
B. Describe the eight phyla in the protist kingdom.
C. Explain how protists get their food.
D. Explain how protists move.
E. Explain how protists reproduce.
F. Discuss how protists benefit and harm people.

Activities:

1. Draw a diagram of an organism from each protist phylum.
2. Draw a diagram of an amoeba and a paramecium and label their parts.
3. Observe protists under a microscope. How many can you identify? Describe how they move and get their food.
4. Visit a hospital medical laboratory to learn how technicians test for disease-causing microbes.
5. Plan and carry out an experiment to grow one more protist species.
6. Research and report on slime molds.

Materials

TEXTBOOKS

S.F. Life Science, Unit 2

Focus on Life Science,
Unit 4

CAPTIONED FILMS

MF40 Paramecium, Euglena and Amoeba
MF73 The Single-Celled Animals: Protozoa

BOOKS

White, Wm., The Edge of the Pond
Sutherland, Louis, Magic Bullets
May, Julian, The First Living Things
Pinney, Roy, Collecting and Photographing Your Microbe
Asimov, Isaac, How Did We Find Out About Germs
Slaton, Wm. and Nellie, Bacteria and Viruses
Leitz, Gerald, Bacteria
Lindemann, Edward, Some Animals Are Very Small

PA38 Identify the characteristics of various kinds of fungi and monerans.

UNIT TOPIC: Fungi and Monerans

ESTIMATED DURATION
2-3 weeks

Vocabulary

fungi
parasite
saprophyte
lichen
algae
moneran
bacteria
virus

Subobjectives/Activities

Subobjectives:

A. Identify the characteristics used to classify fungi.
B. Distinguish between parasites and saprophytes.
C. Identify the structure of fungi.
D. Explain how different fungi find food and reproduce.
E. Explain why fungi are important and useful to people.
F. Describe the structure of lichens.
G. Explain how the fungi and algae in lichen benefit from living together.
H. Explain how monerans are classified.
I. Identify the characteristics of blue-green algae.
J. Identify the characteristics of bacteria and their requirements for growth.
K. Explain how bacteria benefit and harm people.
L. Identify diseases produced by viruses.

Activities:

1. Make a parasite poster listing parasites and their hosts.

2. Label the structures of fungi.

3. Identify fungi that benefit people. Describe how they are useful.

4. Observe bacteria under the microscope.

5. Make list of ways bacteria help or harm people.

6. List viruses that produce diseases in humans. Discuss the treatment of viral infections.

Materials

TEXTBOOKS

Focus on Life Science, Unit 4

S.F. Life Science, Unit 2

CAPTIONED FILM
MF63 Parasitism

BOOKS
Heller, Ruth, Plants That Never Ever Bloom
Sterling, D., Story of Mosses, Ferns, and Mushrooms
Froman, R., Mushrooms and Molds
Kavaler, Lucy, Wonders of Algae

PA39 Investigate how organisms have changed over time.

UNIT TOPIC: Organisms Change Over Time

ESTIMATED DURATION
1-2 weeks

Vocabulary

evolution
natural selection
mutation
selective breeding
fossil

Subobjectives/Activities

Subobjectives:

A. Describe the theory of evolution.
B. Explain natural selection and give examples.
C. Explain how changes in environment can cause changes in species.
D. Explain how mutations and natural selection can cause changes in species.
E. Explain how selective breeding is used to improve plants and animals.

Activities:

1. Write a report on Charles Darwin.

2. Visit a natural history museum to look at exhibits on natural selection and the theory of evolution.

Materials

TEXTBOOKS

Focus on Life Science, Unit 6

S.F. Life Science, Unit 5

CAPTIONED FILMS

F509	The Origin of Life
F607	Ecomega
F980	The Horse Family
MF48	Evolution

BOOKS

May, Julian, Why People Are Different Colors
Asimov, Isaac, How Did We Find Out About Our Human Roots?
Howell, Clark, Early Man
Moore, Ruth, Evolution
Adler, Irving & Ruth, Evolution
Boyd, Wm., & Isaac Asimov, Races and People
Moore, Suzanne, There Was a Time

PA40 Explore careers in the fields of biology or zoology: arboriculturist, microbiologist, food inspector, florist, biochemist, marine biologist, ornithologist, commercial fisher, veterinarian, beekeeper, entomologist, farmer, etc.

UNIT TOPIC: Careers in Biology and Zoology

ESTIMATED DURATION
1-2 weeks

Vocabulary	Subobjectives/Activities	Materials
		CAPTIONED FILMS F763 Country Vet F1022 Is a Career in the Natural Sciences for You? F1031 Is a Career in Fishing or Forestry for You? F1039 Is a Career in Agri-Business for You? **STUDY PRINTS** Careers in a Medical Center

HGR10 Identify parts of the human skeletal system and their functions.

UNIT TOPIC: The Skeletal System

ESTIMATED DURATION
2-3 weeks

Vocabulary

ligament
bone
skeleton
cartilage
joint
muscles
voluntary
involuntary
tendons
skull
cranium
ribs
backbone
vertebra
pelvis
marrow
smooth muscles
striated muscles
heart muscle

Subobjective/Activities

Subobjectives

A. Relate the function of ligaments to bones of the skeleton.
B. Explain the functions of cartilage.
C. Name the parts and functions of the human skeleton.
D. Identify parts of a bone and state their functions.
E. Differentiate between voluntary and involuntary muscles and demonstrate the use of each.
F. Identify three main kinds of muscles in the body.
G. Explain the functions of tendons.

Activities

1. Make a large drawing of the human skeleton, then label the bones with their names.
2. Look at x-ray pictures of humans and various animals.
3. Purchase a whole chicken. Boil it. Remove the meat and put the skeleton back together. Compare the chicken skeleton with a human skeleton.
4. Research and report on one of the following topics: muscular dystrophy, arthritis, scoliosis, osteoporosis, setting broken bones, etc.

Materials

TEXTBOOKS
S.F. Life Science, Unit 4

Focus on Life Science, Unit 5

ESS. "Bones"

CAPTIONED FILMS
F141 The Human Body:Skeleton
F391 About the Human Body
F821 Bones and Joints

FILMSTRIPS
You, The Human Being (EB)
You--The Living Machine (WD) or (EB)

BOOKS
Zim, Herbert, Bones
Ward, Bryan, The Skeleton & Movement

OTHER MATERIALS
Human Body: Systems for Sensing & Moving (study prints)
Systems of the Human Body (duplicating masters)
Human Skeleton Kit
Millikin: The Human Body
Learning About Your Body
Inside Me (body system pictures)
Human Body System (bulletin board)

HGR11 Identify parts of the human respiratory system and their functions.

UNIT TOPIC: The Respiratory System

ESTIMATED DURATION
1-2 weeks

Vocabulary

inhale
exhale
respiratory system
lungs
diaphragm
nose
nostril
mouth
throat
epiglottis
bronchi
larynx
pharynx
trachea

Subobjectives/Activities

Subobjectives

A. Identify the parts of the respiratory system and describe their functions.
B. Describe the movements of the rib cage, chest muscles, and diaphragm during inhalation and exhalation.
C. Relate exercise and the need for added oxygen to increased rates of respiration.

Activities

1. Demonstrate artificial respiration.

2. Research and report on one of the following respiratory diseases.

tuberculosis
emphysema
whooping cough
pneumonia
asthma
lung cancer

Materials

TEXTBOOKS
S.F. Life Science,
Unit 4, Chapter 16

Focus on Life Science, Unit 5

CAPTIONED FILMS
F391 About the Human Body
F472 Our Wonderful Body: How We Breathe
F747 The Work of the Kidneys

FILMSTRIP
The Respiratory System (EB)

BOOK
Gaskin, John, Breathing

OTHER MATERIALS
The Human Body (study prints 1-10)
Systems of the Human Body
(duplicating masters)

(Also see materials for HGR07.)

HGR12 Identify organs involved in digestion and excretion and their functions.

UNIT TOPIC: The Digestive System and Excretion

ESTIMATED DURATION
2-3 weeks

Vocabulary

mouth
tongue
salivary glands
esophagus
gall bladder
liver
stomach
pancreas
small intestine
large intestine
rectum
bladder
kidney

Subobjectives/Activities

Subobjectives

A. Identify the organs involved in digestion. Describe the changes that occur as food goes through the digestive tract.
B. Explain how the digestive system digests and absorbs food.
C. Identify three organs that remove wastes from the body (lungs, kidneys, and skin) and the kinds of wastes they remove.
D. Identify parts of the kidneys and explain how they filter wastes.

Activities

1. Trace the path of food through the body. Explain the functions of each organ of the digestive system.

2. Research and report on kidney transplants.

Materials

TEXTBOOKS
Focus on Life Science, Unit 5

S.F. Life Science, Unit 4

CAPTIONED FILMS

F392	Exploring Your Growth
F747	Work of the Kidneys
F829	Digestion and the Food We Eat

FILMSTRIPS
The Urinary System (EB)
You--And Your Food (WD)
The Digestive System (EB)

OTHER MATERIALS
The Human Body (study prints 1-10)
Systems of the Human Body (duplicating masters)

(Also see materials for HGR07.)

HGR13 Identify organs involved in circulation and their functions.

UNIT TOPIC: The Circulatory System

ESTIMATED DURATION
2-3 weeks

Vocabulary

heart valve
pulmonary artery
right atrium
left atrium
right ventricle
left ventricle
aorta
arteries
veins
blood
capillaries
plasma
red blood cells
white blood cells
lymph
blood clot
blood type
Rh factor

Subobjective/Activities

Subobjectives

A. Identify the parts of the human heart.
B. Locate the pulse and determine the rate of heartbeat.
C. Compare and contrast arteries and veins.
D. Describe the characteristics and functions of capillaries.
E. Trace the flow of blood through the body.
F. Identify the components of blood.
G. Lxplain the function of hemoglobin.
H. Explain the functions of white blood cells.
I. Describe lymph and explain how it relates to the circulatory system.
J. Identify human blood types and the Rh factor.

Activities:

1. Use a blood typing kit to type the blood of volunteers.

2. Find out your own blood type.

3. Find the pulse rates of various members of your family. What differences do you observe in the pulse rates of younger and older people? Try to find the pulse rates of your pets. How does the size of an animal compare with its pulse rate?

4. Take your heart rate while sitting, lying down; standing up: after running; after resting 1, 2, 3, 4, and 5 minutes.

5. Look at and compare the hearts of various animals; chicken, frog, pig, cow.

Materials

TEXTBOOKS

Focus on Life Science, Unit 5

S.F. *Life Science*, Unit 4

CAPTIONED FILMS

F20	Blood and Circulation
F1377	About the Heart: An Inside Story
F724	How Your Blood Circulates
F391	About the Human Body

FILMSTRIPS

The Heart and Circulation (EB)
The Circulatory System (EB)

BOOKS

Schneider, Led, *Lifeline: The Story of Your Circulatory System*
Silverstein, A. & V., *Heartbeats: Your Body, Your Heart*

OTHER MATERIALS

Your Heart, the Mighty Muscle (video)
The Human Body (study prints)
Circulation Game
Systems of the Human Body (duplicating masters)

6. Research and report on heart disease.

7. Use a microscope to identify white and red blood cells and platelets in human blood. Do a blood count of both white and red cells.

HGR14 Investigate how the body is controlled and regulated by the nervous system and the endocrine system.

UNIT TOPIC: The Nervous System and the Endocrine System

ESTIMATED DURATION
2-3 weeks

Vocabulary

- brain
- cerebrum
- cerebellum
- neuron
- spinal cord
- vertebrae
- central
- voluntary
- peripheral nervous system
- autonomic nervous system
- gland
- endocrine system
- pineal body
- hypothalamus
- pituitary
- thyroid
- parathyroid
- thymus
- adrenals
- pancreas
- ovary
- testes

Subobjectives/Activities

Subobjectives

A. Describe how behavior is regulated by the nervous and endocrine systems.
B. Distinguish between the central and peripheral nervous systems.
C. Identify the parts of the human brain and their functions.
D. Explain how messages move in the brain and spinal cord.
E. Identify different types of neurons.
F. Distinguish between voluntary and involuntary acts of the nervous system.
G. Describe the autonomic nervous system and its functions.
H. Identify the endocrine glands and their functions.

Activities

1. Research and report on optical illusions.
2. Investigate ESP.
3. Investigate the work of Ivan Pavlov.
4. Demonstrate the body's reflexes.
5. Investigate reaction times.

Materials

TEXTBOOKS:

Focus on Life Science, Unit 5

S.F. Life Science, Unit 4

CAPTIONED FILM
F105 The Human Nervous System

FILMSTRIP
The Endocrine System (EB)

BOOK
Weart, Edith, The Story of Your Brain and Nerves

OTHER MATERIALS
The Human Body (study prints)
Systems of the Human Body (duplicating masters)

HGR15 Investigate the sense organs.

UNIT TOPIC: The Sense Organs

ESTIMATED DURATION
2-3 weeks

Vocabulary

eye
lens
pupil
iris
optic nerve
retina
image
outer ear
middle ear
inner ear
auditory canal
eardrum
cochlea
auditory nerve
nostril
olfactory nerve
tongue
taste bud
sour
bitter
salty
sweet
cold
pressure
touch
heat

Subobjectives/Activities

Subobjectives

A. Identify the parts of the eye and their functions.
*B. Identify the parts of the ear and their functions.
C. Identify parts of the nose and their functions.
D. Describe how the sense of taste is made possible.
E. Explain the functions of the receptors in the skin.

Activities

1. Research and report on eye problems and their correction.

2. Research and report on cochlear implants.

3. Investigate to locate the four basic taste areas on your tongue. Compare with your classmates.

4. Dissect a cow or sheep eye.

5. Find out what percentage of students and adults in your school wear glasses.

(*See Objective S05 of Sound and Hearing.)

Materials

TEXTBOOKS
S.F. Life Science, Unit 4

Focus on Life Science, Unit 2

Deyo & Erting, Sound and Hearing: An Instructional Unit for Deaf Students

CAPTIONED FILMS

F895	How Much Are Your Eyes Worth?
F813	We'll See Tomorrow
F842	You and Your Eyes
F458	The Ear and Hearing
F840	You and Your Ears
F861	Your Mouth

FILMSTRIPS
Your Sense of Touch (EB)
Human Sense Organs (SVE)
Your Testing Tongue (JH)
The Feel of Your Skin (JH)
You and Your Five Senses (EB)
You and Your Eyes (EB)
You and Your Ears (EB)
Your Senses of Smell and Taste (EB)

VIDEOTAPE
Program 12--Your Birthday Suit--Skin

BOOKS

Martin, Paul, Our Fantastic Five Senses
Zim, Herbert, Our Senses and How They Work
Sislowitz, Marcel, Look! How Our Eyes See)
Stecher, Adam, Your Senses (eyes)

OTHER MATERIALS

The Human Body (study prints 1-10)
Five Senses

HGR16 Investigate the human reproductive system.

UNIT TOPIC: The Reproductive System

ESTIMATED DURATION
2-3 weeks

Vocabulary

testes
ovaries
uterus
puberty
menstrual cycle
fertilization
zygote
coitus
syphilis
gonorrhea
herpes
AIDS

Subobjectives/Activities

Subobjectives

A. Identify the major roles of the testes and ovaries.
B. Discuss puberty and the physical and psychological changes that occur during this time.
C. Describe the changes that occur in the menstrual cycle.
D. Explain how and where fertilization takes place and the possible results of fertilization.
E. Explain how a zygote develops.
F. Explain how twins are produced.
G. Identify the diseases associated with coitus and their symptoms.

Activities

1. Research and report on "test tube" babies.
2. Visit a health clinic to find out about diseases associated with coitus, their prevention and treatment.

Materials

TEXTBOOKS

Focus on Life Science, Unit 6

S.F. Life Science, Unit 4

Growing Up Sexually, (Outreach, Gallaudet Pre-College Programs), Chapters 1, 2, 5, 7

CAPTIONED FILMS

KSF8	The Human Body: Reproductive System
F59	Human Growth
F1504	Human Growth
F1450	Venereal Diseases
KSF85	Girl to Woman
F229	Boy to Man
KDF94	Junior High: A Time of Change
F646	VD: Prevent It
F231	A Quarter Million Teenagers
MF12	When Love Needs Care (V.D.)

FILMSTRIPS

Into Manhood/Into Womanhood
The Reproductive System (EB)

OTHER MATERIALS

SP383 The Human Body (study prints 1-10)

Ask representatives from family planning agencies to visit school and discuss teenage pregnancy, sexually transmitted diseases, and their prevention.

Your school or local library may have a special collection on sexuality.

HGR17 Describe pregnancy and the stages of prenatal development.

UNIT TOPIC: Pregnancy

ESTIMATED DURATION
2-3 weeks

Vocabulary

pregnancy
fertilization
gestation
trimester
placenta
umbilical cord
amniotic sac
labor
delivery
contraction
sonogram
amniocentesis
premature
miscarriage

Subobjectives/Activities

Subobjectives

A. List the signs of pregnancy and explain how pregnancy can be diagnosed.
B. Describe the stages of prenatal development, including what happens during the three trimesters.
C. Explain the functions of the placenta, umbilical cord, and womb during gestation and the birth process.
D. Discuss the importance of prenatal care for physical and emotional health of mother and child. Discuss possible harm to the fetus from chemicals, drugs, alcohol, disease, and nutritional deficiencies.
E. Explain the steps in the birth process.
F. Identify ways to prevent pregnancy.

Activities

1. Visit a family planning agency.

2. Invite a doctor or nurse to class to discuss the importance of prenatal care.

3. Research and report on the tragedies associated with the drug thalidomide.

Materials

TEXTBOOKS
Focus on Life Science, Unit 6

S.F. Life Science, Unit 4

Growing Up Sexually,
Chapters 1, 2, 3, 5

CAPTIONED FILMS

KDF104	Adolescence, Love, and Maturity
F268	From Generation to Generation
F15150	It's Up to Laurie
F1529	Not My Problem
F395	To Plan Your Family
F838	Goodbye, Lynn
F805	The Story of Our New Baby
F255	Biography of the Unborn
F431	Fertilization and Birth
MF6	A Far Cry from Yesterday
MF53	Hope Is Not a Method
MF212	Happy Family Planning

FILMSTRIPS
The Generalized Cell (EGH)
The New Baby (Churchill Films, CF)
Birth of Babies (CF)

OTHER MATERIALS
Your school or local library may have a special collection on pregnancy and family planning.

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HGR18 Investigate the principles of heredity.

UNIT TOPIC: Heredity

ESTIMATED DURATION
2 weeks

Vocabulary

heredity
dominant genes
recessive genes
trait
offspring
mitosis
meiosis
DNA
RNA

Subobjectives/Activities

Subobjectives

A. Define heredity.
B. Compare and contrast dominant and recessive traits.
C. Explain how traits are passed from parents to offspring through pairs of genes located on chromosomes.
D. Explain how sex cells are formed.
E. Explain how sex is determined.
F. Compare mitosis and meiosis.
G. Describe the structure and functions of DNA and RNA.
H. Identify some genetic diseases, including deafness.

Activities

1. Report on a genetic disease such as sickle-cell anemia, Tay-Sachs, hemophilia, cystic fibrosis, PKU.

2. Write a report on Gregor Mendel.

3. Identify dominant and recessive traits: attached/free earlobes, rolling/non-rolling tongue, hair/no hair on fingers.

4. Test classmates and school personnel for color blindness, using a color-blindness chart.

5. Find out about the frequency of genetic deafness.

6. Diagram mitosis and meiosis.

7. Invite a genetic counselor to talk to the class.

Materials

TEXTBOOKS
Focus on Life Science, Unit 6

S.F. *Life Science*, Unit 5

CAPTIONED FILMS
KDF76 Heredity
F624 Inheriting Your Physical Traits

BOOKS
May, Julian, *Do You Have Your Father's Nose?*
Hutchins, Carleen, *DNA*
Showers, Paul, *Me and My Family Tree*
Bendick, Jeanne, *How Heredity Works*

OTHER MATERIALS
Sickle Cell Learning Game

HGR19 Explore careers in the field of medicine: doctor, nurse, nurse's aide, medical technician, medical sonographer, electrocardiograph or x-ray technician, genetic counselor, dietician, optometrist, etc.

UNIT TOPIC: Careers in Medicine

ESTIMATED DURATION
1-2 days

Vocabulary	Subobjective/Activities	Materials
		CAPTIONED FILM F874 Is a Career In Health Services for You?

HSN10 Explain how the nutrients in food are used by the body.

UNIT TOPIC: Nutrition

ESTIMATED DURATION
1 week

Vocabulary

- nutrients
- minerals
- diet
- carbohydrate
- fat
- complete
- incomplete
- protein
- vitamin
- calorie
- nutrition
- calcium
- phosphorus
- magnesium
- iron
- iodine
- zinc

Subobjectives/Activities

Subobjectives:

A. Identify six nutrients present in foods.
B. Explain the importance of water to the body.
C. Explain the functions of some of the major minerals required by the body.
D. Identify the functions of carbohydrates in the body.
E. Identify the functions of fats. List foods high in fats.
F. Distinguish between complete and incomplete proteins.
G. Identify the functions of proteins and list foods rich in protein.
H. Define the term vitamin. Give examples of vitamins and show how each is important to the body.
I. Define the term calorie and explain how calories in food are related to nutrition.

Activities:

1. Test foods for starch. Make predictions first. Drop three drops of iodine solution on such foods as bread, cornstarch, turnip, cooked egg white, potato, rice, cereals, beans, etc.

2. Test foods for fats and oils. Hold brown paper to the light; the light does not pass through. Now rub a small amount of butter or margarine on the paper. Let it dry. Hold the paper to the light and note that light passes through when fats or oils are present. Try the experiment with vegetable oil, peanut butter, cooked egg white, potato, etc. Record your observations.

Materials

TEXTBOOKS
Focus on Life Science,
Unit 5

S.F. Life Science,
Unit 4, Chapter 14

CAPTIONED FILMS
F829 Digestion and the Food We Eat
KSF97 Foods and Nutrition

FILMSTRIPS
You and Your Food (WD)
Diet and Health (EB)
Finding Out How Foods Are Used in Your Body
Food and Living Things (EB)

OTHER MATERIALS
Study Print--Nutrition
Nutrition--Food the Body Needs (National Geographic)

HSN10 Explain how the nutrients in food are used by the body (continued).

3. Research the discovery of vitamins and write a report.
4. Report on the use of preservatives and other chemicals in food.
5. Keep a daily record of your calorie intake. Compare it to a typical 12- to 14-year-old's requirement of 2400 to 2800 calories each day.
6. List foods that are complete and incomplete proteins.
7. Make a food chart using the headings below:

Nutrient	Function in the Body	Good Food Sources

HSN11 Identify causes and prevention of disease.

UNIT TOPIC: Diseases and Their Prevention

ESTIMATED DURATION
2 weeks

Vocabulary

bacteria
protozoan
fungi
epidemic
disease
vaccine
immunity
antibiotic
disinfectant
virus

Subobjectives/Activities

Subobjectives:

A. Identify the causes of disease (bacteria, viruses, protozoans, fungi).
B. Explain how the body's natural defenses protect the body from disease.
C. Define epidemic.
D. Explain how vaccines have helped prevent diseases.
E. Explain how people acquire immunity to diseases.
F. Explain how antibiotics are used to treat disease.
G. Identify ways to prevent disease (disinfectants, quarantine, pasteurization, destruction of carriers, food inspection, public health education, etc.

Activities:

1. Find out which vaccines you have been given to prevent diseases.

2. Learn how bacteria can be helpful. Write a report.

3. Make a chart of human diseases known to be caused by viruses and bacteria. Use the headings below:

Disease	Cause	Symptoms	Method of Control	Cure

Materials

TEXTBOOKS
S.F. Life Science,
Unit 2

Focus on Life Science,
Unit 4

CAPTIONED FILM
F836 Germs and Your Body

BOOK
LeMaster, Leslie J.,
Bacteria and Viruses

FIELD TRIP
Armed Forces Medical Museum

HSN12 Investigate substance abuse.

UNIT TOPIC: Substance Abuse

ESTIMATED DURATION
2-3 weeks

Vocabulary

addiction
abuse
alcohol
cigarette
category

Subobjectives/Activities

Subobjectives:

A. Idenfity categories of drugs; list their effects.
B. Identify reasons why people do or do not take drugs.
C. Define the term addiction. Explain how people become addicted to drugs.
D. Recognize the risks and responsibilities involved in drug use.
E. Identify laws related to drug use.
F. Describe the effects of alcohol on the body.
G. Describe the effects of cigarette smoking on the body.
H. Identify sources of commonly abused drugs.
I. Identify ways to avoid drug use.

Activities:

1. Make a list of all the drugs in your home. Try to classify each drug. (Parents should supervise.)
2. Make a chart listing the names of drugs, their categories, methods of use, and effects on the body. Report to class.
3. Research your state's laws on drug abuse. Ask a policeman to visit class and talk about problems of drug abuse.
4. Report to your class about one drug. Explain its source, category, methods of use, and effects on the body.
5. Find out where people with drug problems can go for help in your community.

Materials

TEXTBOOKS
S.F. Life Science, Unit 4, Chap. 19

Focus on Life Science,
Unit 5, Chapter 17

CAPTIONED FILMS

F604	Easy Way Out
F613	Focus on Marijuana
F653	Your Amazing Mind
F685	From Runaway to Hippie
F642	Smoking: It's Your Choice
F592	Alcohol: A New Focus
MF181	National Institute on Alcohol Abuse and Alcoholism
MF187	Smoke Screen
MF208	Best Friends (smoking)
F1494	The Glug

FILMSTRIPS

BQ-31	Drugs in Our World (HMS)
BQ-32	Drugs and Your Body (HMS)

BOOKS
Elgin, K., Ups and Downs of Drugs
Hozinsky, M., Is This Trip Necessary?: Student Drug Abuse

401

402

OTHER MATERIALS
Drugs and Children (kit
Smoking and Children (kit)
Facts About Drugs (study print)
Drug Information
WOW! (kit of cigarette poisons)
Giant Inflatable Cigarette (lists brand names, harmful ingredients)
Poster: effects of drugs on heart, lungs, liver
Alcohol's Trip Through the Body
Drug posters
Pamphlets on smoking
Drug Enforcement; Drugs of Abuse (teacher resource)
Little Smokey (kit)

HSN13 Explore careers in health, safety, and nutrition: dietician, nutritionist, policeman, detective, doctor, nurse, pharmacist, biochemist, paramedic, health aide, food inspector, security guard, sanitary engineer, etc.

UNIT TOPIC: Careers in Health, Safety, and Nutrition

ESTIMATED DURATION
2-3 weeks

Vocabulary	Subobjectives/Activities	Materials
		TEXTBOOK S.F. Life Science, page 366 **CAPTIONED FILM** F1032 Is a Career in Food Preparation for You?

S08 Investigate the properties of sound.
(Also used as Objective E13 in the Energy area of study.)

UNIT TOPIC: Investigating Sound Energy

ESTIMATED DURATION
1 week

Vocabulary

sound wave
volume
amplitude
pitch
frequency
noise pollution

Subobjectives/Activities

Subobjectives

A. Explain how sound waves are formed.
B. Explain the relationship between sound volume and amplitude; pitch and frequency.
C. Discuss how musical sounds are produced by wind and string instruments.
D. Identify sources of noise pollution.

Activities

1. Find out if your town has laws about how loud sounds can be. Report to the class.

2. Identify the decibel level of common sounds, including musical instruments.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 5

S.F. Physical Science, Unit 5

FILMSTRIPS
Sounds we Hear (SVE)
Make a Joyous Sound (ERS)
The Causes and Nature of Sound (JH)
Light, Heat and Sound (SVE)
Finding Out about Sound (SVE)
How Sound Travels (JH)

BOOKS
Beeler, Nelson, Experiments in Sound

OTHER MATERIALS
SAVI Science Kit: Communication Module

S09 Discuss similarities and differences among hearing impaired people.

UNIT TOPIC: **Deafness and Communication**

ESTIMATED DURATION
1-2 weeks

Vocabulary

onset
degree of loss
ASL
Signed English
Cued Speech
communicate

Subobjectives/Activities

Subobjectives

A. Identify similarities and differences among hearing impaired people (onset of deafness, degree of loss, language capabilities, feelings, etc.).
B. Identify different ways for hearing impaired people to communicate (ASL, Signed English, Cued Speech, Total Communication, Oral Methods, etc.).
C. Identify ways for deaf and hearing people to communicate.
D. Explain the importance of using an interpreter in group settings.
E. Discuss the existence of deaf culture and deaf history.

Activities

1. Take a survey of students to find out:
    a. Age of onset of deafness.
    b. Cause of deafness.
    c. Degree of hearing loss.
    d. Preferred communication mode.

   Compare and publish results.

2. Invite several deaf people to a panel discussion of communication styles.

3. Find information on deaf culture. Write a report about it.

Materials

CAPTIONED FILMS
SF31 Total Communication
MF30 Assuming a Deaf Person Wrong

BOOKS
Deyo, David, Speechreading in Context
Val, Sarah, None So Deaf

S10 Discuss scientific advances in the area of deafness.

UNIT TOPIC: New Ways to Help the Hearing-Impaired

ESTIMATED DURATION
1 week

Vocabulary	**Subobjectives/Activities**	**Materials**
cochlear implant	Subobjectives A. Discuss ways to prevent deafness. B. Discuss the use of chochlear implants and other new treatments for deafness. C. Identify new methods and instruments used in speech therapy. D. Identify communication equipment used by the deaf and demonstrate its use. Activities 1. Make posters showing ways to prevent deafness. 2. Find out about cochlear implants. Write a report. 3. Have a speech therapist visit the class to discuss new methods and instruments used in speech therapy.	**BOOKS** Deyo, David, On My Own (assistive devices) Ring/Flash (TDD and telephone use)

S11 Explore careers in education of deaf students and related areas: speech therapy, audiology, counseling, interpreting, linguistics, etc.

UNIT TOPIC: **Careers in Education of the Deaf and Related Areas**	**ESTIMATED DURATION** 1 week

Vocabulary	**Subobjectives/Activities**	**Materials**

MIDDLE SCHOOL DEPARTMENT

Level 8: Earth Science Course

GEOLOGY

G09 Investigating Organisms
G10 Formation of Igneous & Metamorphic Rocks
G11 Formation of Sedimentary Rocks
G12 Investigating Erosion
G13 Water Systems
G14 Glaciers
G15 Earthquakes
G16 Plate Tectonics Theory
G17 Landforms & Topographical Maps
G18 Age & Geologic History of the Earth
G19 Renewable Natural Resources
G20 Nonrenewable Natural Resources
G21 Energy Resources & Their Use
G22 Careers in Geology

CLIMATOLOGY & OCEANOGRAPHY

C08 The Atmosphere
C09 Weather & Climate
C10 Investigating the Ocean
C11 Moving Water
C12 Careers in Climatology & Oceanography

ASTRONOMY

A10 Models of the Earth
A11 The Earth/Moon System
A12 The Universe, Galaxies, & Stars
A13 Investigating Our Solar System
A14 Space Exploration
A15 Careers in Astronomy

G09 Identify and analyze the properties of minerals.

UNIT TOPIC: Analyzing Minerals

ESTIMATED DURATION
2-3 weeks

Vocabulary

mineral
element
physical properties
luster
streak
crystals
inorganic

Subobjectives/Activities

Subobjectives

A. Identify and describe the characteristics of minerals.
B. Identify and describe the physical properties of minerals: appearance, feel, cleavage, smell, taste, weight.
C. Identify unknown minerals through the scale of luster, the scale of hardness, and the streak test.

Activities

1. List common characteristics of minerals: inorganic, formed in nature, solids, atoms having same internal or crystalline patterm, same chemical composition.
2. Research and report on the most abundant elements in the Earth's crust.
3. Make a chart of the physical properties of sample minerals.
4. Demonstrate use of the scale of luster, the scale of hardness, the streak test, and other means of identifying minerals.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 2

S.F. Earth Science, Unit 2

MAPS, Level 7, Chapter 20

CAPTIONED FILM

F1094 Understanding Our Earth: Rocks and Minerals

BOOKS

Crosby, Phoebe, Jr. Science Book of Rock
Quick, Lelande, The Book of Agates
Shuttersworth, Dorothy, The Story of Rocks
Zim, Herbert, Rocks and Minerals
Gans, Roma, Millions and Millions
Dixon, Dougal, Geology
Lampton, Christopher, Planet Earth

OTHER MATERIALS

Slides: SL198 Important Minerals
Study Prints: Common Rocks and Rock-Forming Minerals

FIELD TRIP

Natural history museum

G10 Investigate the forces that control the formation and properties of igneous and metamorphic rocks.

UNIT TOPIC: The Formation of Igneous and Metamorphic Rocks

ESTIMATED DURATION
1-2 weeks

Vocabulary

heat
pressure
magma
lava
igneous
metamorphic
extrusive
intrusive

Subobjectives/Activities

Subobjectives

A. Describe the sources of heat and pressure beneath the surface of the Earth.
B. Describe how igneous rocks are formed and classified.
C. Differentiate between magma and lava.
D. Describe how metamorphic rocks are formed and classified.
E. Identify and classify igneous and metamorphic rocks from a group of rocks.

Activities

1. List the conditions necessary for the formation of metamorphic rocks.

2. Classify rocks as igneous or metamorphic based on their physical properties. Try to identify rocks by name.

Materials

TEXTBOOKS

Focus on Earth Science, Chapter 6

S.F. Earth Science, Unit 2

MAPS, Level 7, Chapter 20

CAPTIONED FILM

F1094 Understanding Our Earth: Rocks and Minerals

BOOKS

Crosby, Phoebe, Jr. Science Book of Rock Collecting
Shuttersworth, Dorothy, The Story of Rocks
Zim, Herbert, Rocks and Minerals
Lye, Keith, The Planet Earth

FIELD TRIP

Natural history museum

G11 Describe the formation and composition of sedimentary rocks.

UNIT TOPIC: The Formation of Sedimentary Rocks

ESTIMATED DURATION
1-2 weeks

Vocabulary

weathering
erosion
sedimentary
clastic
non-clastic
dis-integration
de-composition
permeable
geode

Subobjectives/Activities

Subobjectives

A. Describe the process of weathering. Identify factors that speed the process.
B. Identify minerals formed by weathering.
C. Define the process of erosion. Differentiate between erosion and weathering.
D. Identify conditions in which sedimentary rocks are formed.
E. Identify different kinds of sedimentary rocks (clastic and non-clastic) and the conditions in which they are formed.
F. Identify and classify sedimentary rocks from among a group of rocks.

Activities

1. Experiment: Determine how acid water causes weathering. You will need six glass jars; fragments of granite, limestone, basalt, and quartz, distilled water, rainwater, and a solution of 7% HCl.

   Jar 1--fragments of all rocks, cover with distilled water.
   Jar 2--fragments of all rocks, cover with rainwater.
   Jar 3--fragments of granite, cover with HCl.
   Jar 4--fragments of limestone, cover with HCl.
   Jar 5--fragments of basalt, cover with HCl.
   Jar 6--fragments of quartz, cover with HCl.

   Which rocks changed the most? What caused the changes?

2. Select sedimentary rocks from a group of rocks. Classify them as clastic or non-clastic sedimentary rocks.

Materials

TEXTBOOKS

Focus on Earth Science, Chapter 6

S.F. Earth Science, Unit 2

MAPS, Level 7, Chapter 20

CAPTIONED FILM

F1094 Understanding Our Earth: Rocks and Minerals

BOOKS

Crosby, Phoebe, Jr. Science Book of Rock Collecting
Shuttlesworth, Dorothy, Story of Rocks
Zim, Herbert, Rocks and Minerals
Lye, Keith, Planet Earth

G12 Investigate the agents of erosion.

UNIT TOPIC: Investigating Erosion

ESTIMATED DURATION
1-2 weeks

Vocabulary

gravity
rockfall
landslide
mudflow
creep
slump
sand dune
loess

Subobjectives/Activities

Subobjectives

A. Identify the four agents of erosion: gravity, wind, water, and glacial ice.
B. Describe how gravity causes erosion, rockfalls, landslides, mudflows, creep, and slump.
C. Identify wind deposits (sand dunes, loess) and factors that affect their creation.

Activities

illustrate them. Write a report.

2. Investigate the kinds of sand dunes and their formation (barchan, transverse, parabolic, longitudinal, star).

3. Experiment: Using flat pans of sand and a hair dryer at different angles, try to form the different kinds of sand dunes. Wear goggles. Report on your findings.

Materials

TEXTBOOKS
Focus on Earth Science, Unit 4

S.F. Earth Science,
Unit 3, Chapter 14

MAPS, Level 7, Chapter 18

CAPTIONED FILMS
F1055 Erosion and Weathering: Looking at the Land
F1059 Geology: A First Film
F1089 Time Changes the Land

FILMSTRIPS
Work of the Sea (SVE)
Work of Running Water (SVE)

G12 Investigate the agents of erosion (continued).

OTHER MATERIALS

Slides:
  - Effects of Running Water
  - Effects of Wind
  - Effects of Snow and Ice
  - Erosion

Study Prints:
  - Erosion
  - 50 Facts About Our Planet

National Geographic kit:
  - A Look at the Earth Around Us: Mountains

G13 Describe how river systems are formed and explain the importance of the groundwater system.

UNIT TOPIC: Water Systems

ESTIMATED DURATION
1 week

Vocabulary

groundwater
solution
deposit
natural bridge
sinkhole
stalactites
stalagmites

Subobjectives/Activities

Subobjectives

A. Describe the formation of a river system.
B. Describe river erosion and deposits.
C. Explain how groundwater causes erosion.
D. Describe the features formed by groundwater solutions and deposits (natural bridges, sinkholes, cave deposits, stalactites, and stalagmites).

Activities

1. Do research on a major river in your area. Find local rivers and creeks that drain into the river on a topographical map. Trace the river drainage to the ocean.

2. Visit a cave.

3. Research and report on one of the following: natural bridge, sinkhole, cave deposit, stalactites, or stalagmites.

4. Experiment to find out what kind of soil is the most permeable--water, sand, or clay.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 4

S.F. Earth Science,
Unit 3, Chapter 14

MAPS, Level 7, Chapter 18

S.F. Science, Level 6,
Unit 7, Chapter 17

BOOKS

Bauer, Ernest, The Mysterious World of Caves
Robbin, Irving, How and Why Wonder Book of Caves
Lye, Keith, Planet Earth

FILMSTRIPS

Work of Groundwater (SVE)
Work of Running Water (SVE)
The Story of Rivers (EB)
Story of Underground Water (EB)

OTHER MATERIALS

National Geographic Kit: A Look at the Earth Around Us: Rivers

G14 Describe the work of glaciers in erosion.

UNIT TOPIC: Glaciers

ESTIMATED DURATION
1 week

Vocabulary

glacier
plucking
striation
cirque
horn
terminal moraine
ground moraine

Subobjectives/Activities

Subobjectives

A. Identify and describe the different kinds of glaciers: valley, continental, and piedmont glaciers.
B. Describe the climatic conditions causing the formation of glaciers.
C. Describe the erosional effects of different types of glaciers.
D. Explain current theories about the origins of recent ice ages.

Activities

1. Investigate the most recent ice age. On a map of the world, outline the areas that were coverd by glaciers.

2. On a map of the world, show existing glaciers today.

3. List and find pictures showing the effects of different types of glaciers.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 4

S.F. *Earth Science*,
Unit 3, Chapter 14

Maps, Level 7, Chapter 19

S.F. *Science*, Level 6,
Unit 7, Chapter 17

CAPTIONED FILM
F976 Eternal Change: The Story of a Mountain

FILMSTRIPS
The Work of Snow and Ice (SVE)
The Story of Ice and Glaciers (EB)

BOOKS
Lauber, Patricia, *Jr. Science Book of Icebergs and Glaciers*
Wood, Frances, *Yellowstone, Glacier*

G15 Describe forces that cause earthquakes, and ways to predict and measure them.

UNIT TOPIC: Earthquakes

ESTIMATED DURATION
1-2 weeks

Vocabulary

force
tension
compression
shearing
buoyancy
fracture
fault
fold
seismograph
Richter Scale
earthquake
focus
epicenter
bodywave
surface wave
interior

Subobjectives/Activities

Subobjectives:

A. Identify and describe the types of forces that affect rocks: tension, compression, shearing, buoyancy.
B. Identify rock structures, including fractures, faults and folds, and describe their formation.
C. Describe the measurements taken by a seismograph and the use of the Richter Scale.
D. Locate earthquake belts of the Earth.
E. Identify the features of an earthquake (focus, epicenter, body waves, surface waves, L, P, and S waves).
F. Describe the structure of the Earth's interior.
G. Explain why earthquakes occur and how they affect populated areas.

Activities:

1. Investigate how animal behavior can help predict earthquakes.

2. On a world map, locate earthquake belts of the Earth.

3. Investigate serious earthquakes in history.

4. Research progress in scientific earthquake prediction.

5. Build a model, using different colors of clay to show fractures, faults, and folds of the earth.

Materials

TEXTBOOKS

Focus on Earth Science,
Unit 5, Chapter 15

S.F. *Earth Science*,
Unit 3, Chapter 11

MAPS, Level 8, Chapter 19

CAPTIONED FILM
F1090 Tomorrow's Quake: Earthquake Predictions

FILMSTRIPS
Work of Internal Forces (SVE)
Earthquakes (PH)

BOOKS
May, Julian, *Why the Earth Quakes*
Lye, Keith, *Planet Earth*
National Geographic *Powers of Nature*

OTHER MATERIALS
Study Prints: 50 Facts About Our Planet

FIELD TRIP
Natural history museum

G16 Investigate the internal forces that change the surface of the earth.

UNIT TOPIC: The Plate Tectonics Theory

ESTIMATED DURATION
1 week

Vocabulary

continent
shield
platform
ridge
system
trench
continental drift
Pangaea
Laurasia
Gondwana

Subobjectives/Activities

Subobjectives:

A. Identify three features of continents (shield, stable platform, folded mountains).
B. Describe features of the ocean floor (mid-ocean ridge system, deep-sea trenches).
C. Discuss the plate tectonics theory and its relation to continental drift and sea floor spreading.
D. Discuss how the continents may have been arranged 200 million years ago (Pangaea, Laurasia, and Gondwana).

Activities:

1. Look at world maps with raised relief details of the ocean floor. Label the features.

2. Draw maps showing Pangaea, Laurasia, and Gondwana.

3. Investigate evidence of the plate tectonics theory.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 5, Chapter 16

S.F. Earth Science,
Unit 3, Chapter 10

BOOKS
National Geographic Society,
Powers of Nature

OTHER MATERIALS
50 Facts about Our Planet,
The Earth (study prints)

G17 Identify and describe different landforms and the use of topographic maps to identify them.

UNIT TOPIC: Landforms and Topographic Maps

ESTIMATED DURATION
2 weeks

Vocabulary

mountain
plain
plateau
strato volcano
dome volcano
topographic map

Subobjectives/Activities

Subobjectives:

A. Identify three basic types of landforms: mountains, plains, and plateaus.
B. Classify mountains according to origin.
C. Identify and describe four types of volcanoes (strato volcanoes, dome volcanoes, shield volcanoes, and cinder cones).
D. Identify types of information that can be obrtained from topographic maps.
E. Identify different features using topographical maps.

Activities:

1. Gather volcanic rock samples to add to a rock collection. Write an explanation of how each rock was formed.

2. Make models of the four types of volcanoes from clay or paper mache'.

3. Look at a topographic map of your local area. Identify the main features.

4. Find pictures showing different kinds of mountains, plains, and plateaus.

5. Research the four types of volcanoes to find out how they differ. Write a report.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 5, Chapter 17

S.F. Earth Science,
Unit 3, Chapter 15

CAPTIONED FILMS
F525 The Earth: Volcanoes
F1089 Time Changes the Land

FILMSTRIPS
The Story of Mountains (EB)
The Story of Volcanoes (EB)

BOOKS

Adams, G., and Wyckoff, J., Landforms
Lauber, Patricia,
Jr. Science Book of Volcanoes
Goetz, Delia, Mountains

G18 Investigate the age of the earth and its history.

UNIT TOPIC: The Age and Geologic History of the Earth

ESTIMATED DURATION
3-4 weeks

Vocabulary

radioactive
fossil
PreCambian Era
Paleozoic Era
Mesozoic Era
Cenozoic Era
extinction

Subobjectives/Activities

Subobjectives:

A. Discuss the use of radioactive clocks in determining the age of the earth.
B. Explain how fossils are used as clocks to find the ages of rocks.
C. Locate information using the geologic time scale.
D. Describe life forms of the PreCambian Era.
E. Describe life forms of the Paleozic Era.
F. Describe life forms of the Mesozoic Era.
G. Describe life forms of the Cenozoic Era.

Activities:

1. Investigate what happened to dinosaurs. Write a report.

2. Start a fossil collection. Describe each fossil and tell when and where the plant or animal lived.

3. Make your own geologic time scale. On it mark eras, periods, the order in which plants and animals appear, and the length of eras and periods in millions of years.

4. Use the geologic time scale to locate information.

5. Classify plants and animals according to era.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 6, Chapters 18, 19

S.F. Earth Science,
Unit 2, Chapter 9

MAPS, Level 8, Chapter 20

CAPTIONED FILM
Dinosaurs: The Terrible Lizards

FILMSTRIPS
How Dinosaurs Lived (PS)
True Book Filmstrips of Biological Science (SVE)
Nature's Wonders (PH)
Fossils/Dinosaurs (EB)

BOOKS
May, Julian, They Turned to Stone
Branley, Franklyn, The Beginning of the Earth
Lye, Keith, Planet Earth
Matthews, Wm., Exploring the World of Fossils
Burton, Virginia, Life Story

MORE BOOKS

Fenton, C.L., Prehistoric World
Life Long Ago
Lagneau, Nicole, Life of Prehistoric Animals
Scheele, Wm., Prehistoric Animals
Dempsey, Michael, & Angela Sheehan, Prehistoric Animals
Diment, Judith, and Anthony Harvey, Animals of Long Ago
Colbert, Edwin, Millions of Years Ago
Hornblow, Leonora & Arthur, Prehistoric Monsters Did the Strangest Things
Eldridge, David, The Giant Dinosaurs
Wise, Wm., In the Time of the Dinosaurs,
Monsters of the Ancient Sea
Sullivan, Nora, Dinosaurs
Green, Carla, How to Know Dinosaurs
Zim, Herbert, Dinosaurs
Jackson, Kathryn, Dinosaurs
National Geographic, Giants from the Past
Howell, F., Early Man
Moore, Ruth, Evolution

OTHER MATERIALS

Study Prints:
- Dinosaurs and Other Prehistoric Creatures: Reptiles
- Dinosaurs and Other Prehistoric Creatures: Mammals
- The Earth
- 50 Facts About Our Planet

National Geographic kits:
- The Earth and Its Life
- Learning About Dinosaurs
- America's Ice Age Hunters

Duplicating masters:
- Earth Science
- Dinosaurs and More Dinosaurs

FIELD TRIP

Natural history museum

438

439

G19 Identify renewable natural resources and how they are used.

UNIT TOPIC: Renewable Natural Resources

ESTIMATED DURATION
2 weeks

Vocabulary

natural resource
renewable
nonrenewable
pollution
acid rain
preservation

Subobjectives/Activities

Subobjectives

A. Define and identify natural resources.
B. Differentiate between renewable and nonrenewable resources.
C. Identify sources and effects of air pollution, including acid rain.
D. Discuss land use and preservation.
E. Identify water resources and sources of water pollution.
F. Describe ways to control pollution.

Activities

1. List natural resources on a chart. Classify them as renewable or nonrenewable.

2. Make a poster that shows sources of air and water pollution.

3. Visit a water treatment plant.

4. List ways you and your family may contribute to pollution.

5. Experiment: Water several plants with liquids at different pH levels to learn how acid rain can affect plant growth.

6. Find out how air pollution is measured in your area.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 7, Chapter 20

S.F. Earth Science,
Unit 5, Chapter 24

MAPS, Level 7, Chapter 23

S.F. Science, Level 6,
Unit 6, Chapters 15, 16

CAPTIONED FILMS

F425	Our Productive Resources
F515	Water Pollution: Can We Keep Our Water Clean?
F530	Air Pollution
F648	Water Pollution
F748	The World Is a Bank
F879	Urban Impact on Weather & Climate

FILMSTRIPS
Pollution of the Atmosphere (HMS)
Pollution of the Waters (HMS)
Pollution Series (CF)

BOOK
Berger, Melvin, Pollution Lab

OTHER MATERIALS

Study Prints:	Man Misuses His Environment Restoring & Conserving the Environment Ecology: The Pollution Problem
Duplicating Masters:	People and the Earth's Resources Problems of Pollution
Science kit:	Saving Our Planet

G20 Identify nonrenewable natural resources and how they are used.

UNIT TOPIC: Nonrenewable Resources

ESTIMATED DURATION
2 weeks

Vocabulary

nonrenewable resources
conserve
recycle
mine
mineral
ore

Subobjectives/Activities

Subobjectives

A. Identify nonrenewable resources, where they are found and how they are used
B. Identify the effects of mining on the environment
C. Identify ways to conserve and recycle nonrenewable natural resources

Activities:

1. Make a chart listing nonrenewable resources, where they are found and how they are used.

2. Identify various mining methods (shaft mines, strip mines, quarries) and their effect on the environment. Write a report.

3. Begin a recycling project in your school to earn money for a class trip or other need. Make posters to explain the project.

4. Find out what materials can be recycled. Make a bulletin board to inform other people.

5. Visit a recycling center.

Materials

TEXTBOOKS
Focus on Earth Science, Unit 7, Chapter 21

S.F. Earth Science, Unit 5, Chapter 24

CAPTIONED FILMS
F565 Recycling of Waste Materials
F559 Man's Effect on the Environment
F635 Once Upon a Wilderness
F983 Land Use and Misuse
F614 From the Face of the Earth

FILMSTRIP
Recycling: An Ecology Study

OTHER MATERIALS
People and the Earth's Resources (duplicating masters)
Ecology and Energy Action Pack
Energy From the Earth (National Geographic kit)

G21 Describe U.S. energy resources and their use.

UNIT TOPIC: Energy Resources and Their Use

ESTIMATED DURATION
3-4 weeks

Vocabulary

energy
dam
windmill
solar
nuclear energy
fuel

Subobjectives/Activities

Subobjectives

A. Identify sources of wind and water energy (running water, dams, windmills).
B. discuss the pros and cons of solar energy.
C. Discuss the pros and cons of nuclear enery.
D. Identify fossil fuels.
E. Describe the steps involved in coal formation. Identify its uses.
F. Describe how oil and natural gas are formed and stored beneath the earth's crust.
G. Identify other sources of energy and their uses (gasohol, coal gasification, tidal and geothermal power, etc.)
H. Identify ways to conserve energy

Activities:

1. Experiment: Find out which color of construction paper absorbs the most solar energy.

2. Choose and build a project to demonstrate the benefits fits of solar energy.

3. Write to your electric and gas companies to learn what energy sources are currently being used in your area. Report to the class.

4. Debate the pros and cons of nuclear energy. Take a survey of opinions in your school. Record the results.

5. Research and report on one of the following topics: the formation, production, or uses of coal; oil formation; natural gas formation; coal gasification; gasohol; tidal or geothermal power.

6. Make a poster that illustrates ways to conserve energy.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 7, Chapter 22

S.F. Earth Science,
Unit 5, Chapter 23

CAPTIONED FILM
F1053 Coal: The Rock That Burns

OTHER MATERIALS
Energy From the Sun (National Geographic kit)

FIELD TRIP
Nuclear power plant

G22 Explore careers in the field of geology: surveyor, bulldozer operator, volcanologist, seismologist, coal inspector, geologist, soil conservationist, soil scientist, park ranger, geological lawyer, etc.

UNIT TOPIC: Careers in Geology

ESTIMATED DURATION
1 week

Vocabulary	**Subobjectives/Activities**	**Materials**
career geology	Activities 1. Choose a career in geology. Investigate it and write a report. 2. Invite professionals in the field of geology to your school to talk about their work. 3. Make a "Careers in Science" book. Write paragraphs about different careers in various areas of science	**TEXTBOOK** S.F. Earth Science, pages 184 & 300 **CAPTIONED FILM** F1038 Is a Career in Mining, Petroleum, or Gas Production for You?

C08 Identify the composition and structure of the atmosphere.

UNIT TOPIC: The Atmosphere

ESTIMATED DURATION
2 weeks

Vocabulary

atmosphere
layer
troposphere
stratosphere
mesosphere
thermosphere
barometer
pressure
oxygen
nitrogen
carbon dioxide
hydrogen
argon
neon
helium
methane
ozone
radiation
conduction
convection
doldrums
trade winds
prevailing westerlies
jet stream
polar easterlies

Subobjectives/Activities

Subobjectives:

A. Identify important gases in the earth's atmosphere.
B. Identify the four layers of the atmosphere.
C. Demonstrate how common atmospheric properties are measured using simple instruments:
D. Explain the effects of radiation on the earth (greenhouse effect).
E. Identify and compare methods of heat transfer: conduction, convection, and radiation.
F. Describe the pattern of major air circulation on earth.
G. Identify and compare wind systems: doldrums, tradewinds, prevailing westerlies, polar easterlies, jet streams.

Activities

1. Write a report on the use of balloons for research in the upper atmosphere.
2. Measure atmospheric pressure using a barometer (purchased or homemade).
3. Write a report on the greenhouse effect.
4. Discuss whether the world's climate is heating up or cooling down.
5. Discuss the depletion of the ozone layer.

Materials

TEXTBOOKS

S.F. Earth Science,
Unit 4, Chapter 6

Focus on Earth Science,
Unit 3, Chapter 8

Maps, Level 8, Chapter 17
Level 7, Chapter 21

CAPTIONED FILM

F797 Ocean of Air

FILMSTRIPS

Atmosphere & Its Circulation (EB)
Weather (EB)
What Is Air Pressure (C)
A Composition of Air (C)
The Earth's Atmosphere (C)

BOOK

Lye, Keith, Planet Earth

OTHER MATERIALS

50 Facts About Our Earth
(study print)
Earth Science
(duplicating masters)

C09 Investigate weather and climate.

UNIT TOPIC: Weather and Climate

ESTIMATED DURATION
3 weeks

Vocabulary

climate
tropics
Tropic of Cancer
Tropic of Capricorn
polar region
temperate zone
humidity
relative humidity
dew point
precipitation
high pressure
low pressure
warm front
cold front
tornado
hurricane
blizzard
meteorologist
air mass

Subobjectives/Activities

Subobjectives:

A. Differentiate between weather and climate.
B. Explain what causes seasons on earth.
C. Identify and compare the five climatic zones.
D. Identify and describe the factors that influence climate: mountains, air currents, large bodies of water.
E. Explain the relationships among humidity, relative humidity, and the dew point.
F. Describe the conditions that bring on vatious kinds of precipitation: rain, hail, sleet, snow.
G. Describe the relationships between high and low pressure and how weather is affected by them.
H. Describe how warm and cold air masses cause weather to change.
I. Describe the conditions necessary for severe weather to occur: tornadoes, hurricanes, blizzards.
J. Identify the kinds of information that is supplied by weather maps.
K. Explain how meterologists gather data and forecast weather.

Activities:

1. Draw a diagram of the Earth, showing how the sun's waves pass through different thicknesses of air from the equator to the poles.

2. Learn the symbols used on weather maps; interpret a weather map.

3. Write a report on a severe weather condition and how it forms: tornado, hurricane, blizzard.

4. Have a meteorologist come to school and explain how weather forecasts are made.

Materials

TEXTBOOKS

S.F. Earth Science,
Unit 4, Chapters 19, 20

Focus on Earth Science,
Unit 3, Chapter 9

Maps, Level 8, Chapter 17

CAPTIONED FILMS

F827 Cold Front
F879 Urban Impact on Weather and Climate
F882 Weather Forecasting

FILMSTRIPS

Why Does Weather Change? (SVE)
Climate & Plants (McG.H.)
Let's Look at the Weather (WD)
Two Different Climates (EB)

BOOKS

Lye, Keith, Planet Earth
Lehr, Paul, Weather
Updegraff, Imelda & Robert, Continents and Climates

UNIT TOPIC: **Investigating the Ocean**

ESTIMATED DURATION
2 weeks

Vocabulary

hydrosphere
groundwater
water cycle
elements
solution
marine
continental shelf
continental slope
mid-ocean ridge
trench
shoreline

Subobjectives/Activities

Subobjectives:

A. Name the parts of the hydrosphere: the ocean, groundwater, water in lakes and rivers, ice in glaciers.
B. Review the water cycle and describe the relationship between the water cycle and solar energy.
C. Identify the elements in solution in ocean water.
D. Classify marine animals such as plankton, nekton, and benthos.
E. Describe the methods used to map the ocean floor.
F. Identify and describe topographical features of the ocean: shore zone, continental shelf, continental slope, abyssal plains, mid-ocean ridge, rift zone, trenches.

Activities

1. Look at a topographical map of the ocean floor. Identify and label the features shown on the map.

2. Investigate ocean research today. Write a report.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 3, Chapter 10

S.F. Earth Science, Unit 4, Chapter 21

Maps, Level 8, Chapter 18

S.F. Science, Level 6, Unit 7, Chapter 18

CAPTIONED FILMS

F510 How Level Is Sea Level?
F514 Oceanography: Study of the Ocean
F516 One Big Ocean
F606 Ecology: Community Beneath the Sea
F887 Adaptation to Ocean Environments

FILMSTRIPS

Ecology of the Sea (HMS)
Under the Ocean (PH)

BOOKS

Sherman, Diane, You and the Ocean
Engel, Leonard, The Sea
Goldin, Augusta, The Bottom of the Sea
Asimov, Isaac, ABC's of the Ocean
Marshall, Norman, Oceanlife
Berrill, N.J., The Life of the Ocean
May, Julian, Plankton
Morris, D., Underwater Life: The Oceans
Wood, J.N., Nature's Hide-and-Seek Oceans

C10 Investigate the Ocean (materials, continued).

OTHER MATERIALS

Study Prints:
- Life in the Sea I
- Life in the Sea II
- Tools of Oceanography
- Topography of the Sea Floor
- Sediments of the Sea Floor
- Ocean Meterology
- The Sea
- 50 Facts About Our Planet
- Mysteries & Marvels of Ocean Life

Duplicating Masters:
- Understanding the Sea
- Atlantic Ocean
- Oceanography
- The Ocean World

National Geographic Kits:
- A Look at the Earth Around Us: Oceans
- Life in the Sea
- Life on a Coral Reef

C11 Investigate the movement of water within the ocean.

UNIT TOPIC: Moving Water

ESTIMATED DURATION
1 week

Vocabulary

waves
currents
tides
crest
trough
wave length
tsunamis
neap tide
spring tide

Subobjectives/Activities

Subobjectives:

A. Explain how water temperature affects water currents.
B. Explain the causes of waves.
C. Describe water waves and their effects.
D. Explain the causes and effects of tides.
E. Describe how coastal landscapes are changed by waves, tides, currents, and winds.

Activities

1. Find out what causes tsunamis. Write a report about severe tsunamis in recent history.

2. Get a time schedule of the tides. Discuss how to read it.

Materials

TEXTBOOKS

Focus on Earth Science,
Unit 3, Chapter 11

S.F. *Earth Science*,
Unit 4, Chapter 22

Maps, Level 8, Chapter 18

S.F. *Science*, Level 6,
Unit 7, Chapter 18

CAPTIONED FILMS
How Level Is Sea Level?
The Beach: A River of Sand

OTHER MATERIALS
Water (study print)
Oceanography (dup. masters)

C12 Explore careers in climatology and oceanography: oceanographer, weather forecaster, meteorologist, climatologist, meteorological technician, instrument specialist, marine biologist, marine engineer, technical writer, etc.

UNIT TOPIC: Careers in Climatology and Oceanography

ESTIMATED DURATION
2 days

Vocabulary	**Subobjectives/Activities**	**Materials**
	Activities:	**TEXTBOOKS**
	1. Write a report on one job in the field of climatology and oceanography.	S.F. Earth Science, page 432
		CAPTIONED FILMS
	2. Invite professionals in these fields to speak to the class about their jobs.	F883 Weatherman: A Scientist KSF79 Weather Scientists

A10 Investigate models to explain the earth.

UNIT TOPIC: Models of the Earth

ESTIMATED DURATION
1 Week

Vocabulary

globe
model
latitude
longitude
scale
legend
topographic map
symbols
elevation

Subobjectives/Activities

Subobjectives:

A. Describe the globe as a model of the Earth and recognize that people live on the Earth.
B. Define and locate lines of latitude and longitude on a map and explain their use.
C. Explain the meanings of scale and legend on a map.

Activities:

1. Learn to read a topographic map. Label features on a topographic map.

2. Determine the elevation of your hometown.

3. Locate the lines of latitude and longitude on a globe. Explain their use.

4. Make a legend for a map.

5. Measure the distance between two cities using the map scale.

6. Draw a map of your neighborhood or school area using topographic map symbols.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 2

S.F. Earth Science,
Unit 3, Chapter 15

FILMSTRIPS:
Latitude & Longitude:
Time Zones & Climate (McGH)
Globes: Our Most Accurate Maps (McGH)
Using the Globe (MES)
Maps of Physical Features (MES)
The Globe (MES)

OTHER MATERIALS:

For free astronomy materials, write to:
Young Astronaut Council
1211 Connecticut Ave., NW
P.O. Box 65432
Washington, DC 20036

A11 Investigate the Earth-Moon System.

UNIT TOPIC: The Earth-Moon System

ESTIMATED DURATION
3 Weeks

Vocabulary | **Subobjectives/Activities** | **Materials**

Vocabulary

gravitation
theory
density
specific gravity
international date line
time zone
latitude
longitude
surface
lunar eclipse
solar eclipse
umbra
penumbra

Subobjectives/Activities

Subobjectives:

A. Explain the dust cloud theory of the origin of the solar system.
B. Explain the relationship between gravitation and the movements of objects in space.
C. Identify the measurements of the Earth and the moon (size, density, specific gravity).
D. Identify the Earth's time zones and the international date line.
E. Explain the use of lines of latitude and longitude to divide the Earth into time units.
F. Identify the phases of the moon and demonstrate the position of the moon during its phases.
G. Describe the surface features of the moon and explain how they were formed.
H. Define and compare lunar and solar eclipses.
I. Explain the causes of umbra and penumbra.

Activities:

1. Find out the measurements of the Earth and the moon: size, density, and specific gravity. Compare them.

2. Label the Earth's time zones and the international date line. Compare times in different countries.

3. Explain the differences between lunar and solar eclipses. Demonstrate both using models of the Earth, sun, and moon.

4. Write a report on human exploration of the moon.

Materials

TEXTBOOKS
Focus on Earth Science,
Unit 1, Chapter 3

S.F. Earth Science,
Unit 1, Chapter 5

Maps, Level 8
Chapter 22, 23

STUDY PRINT
50 Facts about Our Planet

FIELD TRIP
Air and Space Museum

A12 Investigate the universe, galaxies, and stars.

UNIT TOPIC: The Universe, Galaxies and Stars

ESTIMATED DURATION
2 weeks

Vocabulary

astronomer
Newton
telescope
radiant
energy
universe
galaxy
comet

Subobjectives/Activities

Subobjectives

A. Identify important astronomers and their contributions.
B. Identify and discuss Newton's Three Laws of Motion.
C. Identify different types of telescopes.
D. Discuss how forms of radiant energy are identified.
E. Discuss the origin of the universe.
F. Define a galaxy and identify three different types.
G. Describe the life cycle of a star.
H. Describe how stars are classified.

Activities

1. Write the biography of one famous astronomer.
2. List and demonstrate Newton's Three Laws of Motion.
3. Demonstrate how to separate a light wave into colors using a prism.
4. Investigate evidence supporting the big bang theory.
5. Find pictures showing the three types of galaxies. What type is the Milky Way?
6. Make posters to show how light goes through refracting and reflecting telescopes.
7. Find our sun on a diagram of the Milky Way galaxy.

Materials

TEXTBOOKS:

Focus on Earth Science,
Unit 8, Chapter 23

S.F. Earth Science,
Unit 1, Chapters 2-4

Maps, Level 8, Chapter 23

CAPTIONED FILMS

MF185 Cosmic Zoom
F100 Beyond Our Solar System
F111 Exploring the Universe
F166 The Milky Way
F661 The Age of Astronomy

FILMSTRIPS

How Worlds Begin (WD)
Mt. Wilson Palomar Telescope (EB)
Communicating with the Stars (HMS)

STUDY PRINT

50 Facts About Space

FIELD TRIPS

Naval Observatory, Planetarium
Air & Space Museum

BOOKS

Friedman, Herbert, The Amazing Universe
Zim, Herbert, Stars
Bergaming, David, The Universe
Muirden, James, Observer's Guide to Halley's Comet
Branley, Franklyn, The Sun: Star Number One
Hechart, Barbara, Edmond Halley: The Man and His Comet

A13 Investigate the motions and bodies of the solar system.

UNIT TOPIC: Investigating Our Solar System

ESTIMATED DURATION
2-3 weeks

Vocabulary

Milky Way
core
photosphere
chromosphere
prominences
corona
sunspot
solar flare
aurora borealis
comet
meteoroid
meteorite
planets

Subobjectives/Activities

Subobjectives

A. Describe the Milky Way and the position of the sun in it.
B. Define and identify features of the sun: core, photosphere, chromosphere, prominences, corona, sunspots, solar flares, aurora borealis, solar wind.
C. Describe the features of Mercury.
D. Describe the features of Venus, and compare it to Earth.
E. Describe the unique features of the Earth.
F. Contrast Earth and Mars.
G. Describe the features of asteroids and explain their probable origins.
H. Describe Jupiter's characteristics and the features of Jupiter's famous moons.
I. Describe the major features of Saturn.
J. Describe what is known about the features of Pluto.
K. Differentiate between comets, meteoroids, and meteorites.

Activities

1. Report on Halley's Comet.

2. Report on the journey of the Voyager into space.

3. Report on the U.S. exploration of Mars.

4. Report on Jupiter's moons or Saturn's rings.

5. Collect information and pictures of each planet, and make a book on our solar system.

Materials

TEXTBOOKS

Focus on Earth Science,
Unit 8, Chapter 24

Earth Science,
Unit 1, Chapter 5

MAPS, Level 8, Chapter 23

CAPTIONED FILM
F661 The Age of Astronomy

FILMSTRIPS
Life in Our Solar System (WD)
Finding Out About Our Solar Sustem (SVE)

OTHER MATERIALS
The Solar System and Space Travel
Solar System
50 Facts About Space

FIELD TRIP
Air & Space Museum

A14 Investigate space exploration.

UNIT TOPIC: Space Exploration

ESTIMATED DURATION
1 week

Vocabulary

satellite
space shuttle
exploration

Subobjectives/Activities

Subobjectives

A. Define satellites and identify their various uses.
B. Describe several major events in the history of space travel.
C. Explain the advantages and disadvantages of space probes as opposed to manned exploration.
D. Discuss the possibility of life on other planets.

Activities

1. Build and launch a model rocket. Explain how rockets work.
2. Make a timeline showing the sequence of U.S. space exploration efforts.
3. List various uses of satellites.
4. Debate the pros and cons of a "Star Wars" defense system.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 8, Chapter 25

S.F. Earth Science, Unit 1, Chapter 2

Maps, Level 8, Chapter 21

S.F. Science, Level 6, Unit 8, Chapter 22

FILMSTRIPS
How Space Science Helps Us (FH)
How Gravity Works (FH)
The Story of Rocketry (WD)
How an Astronaut Lives in Space (FH)

CAPTIONED FILMS
F449 Rockets & Satellites
F519 Space Exploration for Beginners
F248 Missile Makers
F1078 Model Rocketry: The Last Frontier

STUDY PRINT: 50 Facts About Space

FIELD TRIPS: Air & Space Museum, Goddard Space Flight Center

BOOKS: Dietz, David, All About Satellites and Space Ships
Ley, W., Von Braun, W., The Exploration of Mars
Greene, Carol, Astronauts
Fradin, Voyager Space Problems

A15 Explore careers in the field of astronomy: scientific toolmaker, satellite technician, astronomer, astronaut, spacecraft technician, solar equipment technician, engineer, etc.

UNIT TOPIC Careers in Astronomy

ESTIMATED DURATION
3 days

Vocabulary	Subobjectives/Activities	Materials
	Activities 1. Write reports on different careers in astronomy. 2. Ask people in the field of astronomy to visit the class and talk about their jobs.	**CAPTIONED FILMS** F248 Missile Makers F1033 Is a Career In Civil Aviation for You?

MIDDLE SCHOOL DEPARTMENT

Level 9: Physical Science Course

FORCE, WORK, & MOTION		PROPERTIES OF MATTER		ENERGY	
F11	Machines Do Work	PM11	Review of Metric System	E10	Investigating Wave Energy
F12	Changes in Motion	PM12	Investigating Matter	E11	Properties of Light
F13	Newton's Laws	PM13	The Periodic Table	E12	Investigating Lenses
F14	Careers in Physics	PM14	Compounds	E13	" " Sound Energy
		PM15	Metals	E14	" " Heat Energy
		PM16	Nonmetals	E15	" " Energy Transfer
		PM17	The Carbon Family	E16	" " Electricity
		PM18	Organic Compounds	E17	" " Magnetic Energy
		PM19	Solutions	E18	" " Nuclear Radiation
		PM20	Chemical Reactions	E19	" " Energy Alternatives
		PM21	Acids, Bases, & Salts	E20	" " Careers in Energy
		PM22	Careers in Chemistry		

F11 Investigate how machines can change forces and do work.

UNIT TOPIC: Machines and Work

ESTIMATED DURATION
1 week

Vocabulary

weight
force
gravity
power
distance
simple machine
mechanical advantage
compound machine

Subobjectives/Activities

Subobjectives:

A. Explain the relationship between weight and the force of gravity.
B. Explain how work is related to force and distance.
C. Identify six simple machines and explain how each operates.
D. Determine the mechanical advantage of each type of simple machine.
E. Identify compound machines.

Activities:

1. Choose a compound or complex machine. Examine it carefully. Then list all the simple machines you can find in it. (Use a typewriter, alarm clock, nutcracker, corkscrew, etc.)

2. Measure force using a spring scale.

3. Use the proper formula to calculate work done.

4. Calculate the mechanical advantages of various simple machines.

5. Calculate power through a simple word problem.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 1

S.F. Physical Science,
Units 1 and 2

CAPTIONED FILMS
F567 Simple Machines at Sea
F359 Machines Help Us.

FILMSTRIPS
Simple Machines (SVE)
Machines: What Do They Do? (MDC)
Machines and Tools to Help Us Work (SVE)

OTHER MATERIALS
Simple Machines (study print)
Machines

F12 Investigate changes in motion resulting from the action of forces.

UNIT TOPIC: Changes in Motion

ESTIMATED DURATION
1-2 weeks

Vocabulary

mass
weight
gravity
weightlessness
speed
velocity
average speed
acceleration
kinetic energy
potential energy
deceleration

Subobjectives/Activities

Subobjectives:

A. Differentiate between mass and weight.
B. Define gravity and weightlessness.
C. Compare and contrast speed, velocity, and average speed.
D. Compare acceleration and deceleration.
E. Explain how force is used in rockets and space travel.
F. Define kinetic and potential energy and give examples.

Activities:

1. Identify the kinds of forces and motion involved in various sports. What kinds of safety equipment are used to absorb force?

2. Observe and discuss what happens to your weight as you stand on a bathroom scale in a moving elevator.

3. Calculate speed of a moving object using the proper formula.

4. Calculate acceleration of an object from a simple word problem.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 1

S.F. Physical Science, Unit 1

MAPS, Level 7, Chapter 12

CAPTIONED FILMS

F1566 Studying Gravitiation and Mass
F13 Gravity: How It Affects Us

F13 Investigate Newton's Laws.

UNIT TOPIC: Newton's Laws

ESTIMATED DURATION
1 week

Vocabulary

Isaac Newton
gravity
centripetal force
mass
velocity
momentum
motion

Subobjectives/Activities

Subobjectives:

A. Identify Newton's laws and give examples of each.
B. Explain the effect of gravity on falling objects.
C. Define centripetal force.
D. Explore the relationships among mass, velocity, and momentum.

Activities:

1. Find pictures that show examples of Newton's three laws of motion and centripetal force. Explain.

2. Design and demonstrate an experiment to show Newton's three laws of motion.

3. Write a report about Isaac Newton.

Materials

TEXTBOOKS:
Focus on Physical Science, Unit 1

S.F. Physical Science, Unit 1

MAPS, Level 7, Chapter 12

F14 Explore careers in the field of physics: mechanical or aerospace engineer, auto mechanic, millwright, machinist, architect, pilot, physical therapist, carpenter, etc.

UNIT TOPIC: **Careers in Physics**

ESTIMATED DURATION
1 week

Vocabulary	Subobjectives/Activities	Materials
		TEXTBOOKS S.F. Physical Science, pages 88, 148 Focus on Physical Science, page 82 **CAPTIONED FILMS** F362 So You Want to Be a Toolmaker! F696 Is a Career is Machining for You?

PM011 Review the Metric System.

UNIT TOPIC: Review of the Metric System

ESTIMATED DURATION
2 weeks

Vocabulary

length
distance
volume
mass
temperature
metric system
metric units
millimeter
centimeter
kilometer
meter
milliliter
liter
cubic centimeter
milligram
gram
Celsius
square meter
beakers
graduated cylinders
metric ruler
metric weights
ton
degree
square centimeter
flasks
meter stick
celsius thermometer

Subobjectives/Activities

Subobjectives:

A. Measure length and distance. Demonstrate the ability to convert from larger to smaller metric units (and vice versa).
B. Measure volume. Demonstrate the ability to convert from larger to smaller metric units (and vice versa).
C. Measure the mass of objects. Demonstrate the ability to convert measurements from larger to smaller metric units (and vice versa).
D. Measure temperature in metric units.
E. Select appropriate tools for measuring. Demonstrate the ability to take accurate metric measurements (length, area, volume, mass, weight, temperature).

Materials

TEXTBOOKS

Focus on Physical Science, Unit 1

S.F. Physical Science, Unit 1

Maps, Level 7,
Chapters 8, 9, 10, and 14

CAPTIONED FILMS

MF47	Meter Litre Gram
F1076	Metrics—Mass and Temperature
F987	Metrics—Measurement for Today
F298	Volume and Its Measurement
F332	The Metric System
F705	A Metric America

FILMSTRIPS

Using Standard Units (CO)
Measuring Length (CO)
Measuring Weight (CO)
Measuring How Long (JH)
Measuring How Much (JH)
Introducing the Metric System (EFP)
Linear Measure (EFP)
Measuring Weight and Volume (EFP)

OTHER MATERIALS: SAVI Science Kit—Measurement

FIELD TRIP: Science Center metric exhibit

PM12 Investigate the characteristics of matter and some of its properties.

UNIT TOPIC: Investigating Matter

ESTIMATED DURATION
2 weeks

Vocabulary

matter
homogeneous
heterogeneous
physical property
chemical property
density

Subobjectives/Activities

Subobjectives:

A. Define matter. Explain its various states and their characteristics.
B. Differentiate between homogeneous and heterogeneous matter.
C. Define and identify physical and chemical properties of matter.
D. Compare and differentiate between chemical and physical changes.
E. Define and investigate density as a physical property.

Activities:

1. Classify objects as either heterogeneous or homogeneous.

2. For several substances, identify these physical properties: melting point, physical state, luster, malleability, odor, color, taste, electrical conductivity, etc.

3. Determine the density and specific gravity of various substances.

Materials

TEXTBOOKS

S.F. Physical Science, Unit 3

Focus on Physical Science, Unit 2

Maps, Level 7, Chapters 9 and 10

ESS, "Kitchen Physics"

CAPTIONED FILMS

F1567 Studying Heat and Its Behavior (Matter)
F690 How does a Candle Burn? (Gases)
KSF87 States of Matter
KSF86 Properties of Liquids

FILMSTRIPS

Chemical Change (EB)

OTHER MATERIALS

SAVI Science Kit: Kitchen Interactions

PM13 Recognize the periodic table of elements, and use information from the table.

UNIT TOPIC: The Periodic Table

ESTIMATED DURATION
1-2 weeks

Vocabulary

element
symbol
names of common elements
periodic table
atomic mass

Subobjectives/Activities

Subobjectives:

A. Define an element and give symbols for common elements.
B. Identify and define the parts of an atom.
C. Identify and describe families of elements and locate them on the periodic table.
D. Explain the arrangement of elements in the periodic table.
E. Define atomic mass.

Activities

1. Match an element with its symbol.
2. Write a report on one family of elements from the periodic table.
3. Visit a museum to see samples of the elements.
4. Collect samples of as many elements as you can.

Materials

TEXTBOOKS

Focus on Physical Science,
Unit 2

S.F. Physical Science,
Unit 3

MAPS, Level 8, Chapter 7

CAPTIONED FILMS
F1049 Chemistry in Nature
F1042 The Alkali Metals

PM14 Describe compounds and explain how they are formed.

UNIT TOPIC: Compounds

ESTIMATED DURATION
2 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
compound formula atoms crystal bonding	Subobjectives A. Define compounds and recognize compound formulas. B. Investigate how atoms combine to form compounds. C. Investigate the structure of crystals as related to their bonding. Activities 1. Construct models of atoms using clay or plastic foam balls and thin copper wire. 2. Make crystals using borax and water. Be sure to wear safety goggles and gloves. Add borax a spoonful at a time to a jar of hot water, and stir. Keep adding borax until it no longer dissolves. Suspend a paper clip in the solution from a string tied to a pencil. Observe how crystals form as the water cools. 3. Make drawings of the various crystalline shapes. 4. Match the formula of a compound to its substance. 5. List the elements in a particular compound formula.	**TEXTBOOKS** S.F. Physical Science, Unit 4 Focus on Physical Science, Unit 2 MAPS, Level 8, Chapter 7

PM15 Identify the characteristics of metals and the uses of some important metals.

UNIT TOPIC: Metals

ESTIMATED DURATION
1-2 weeks

Vocabulary

metal
iron
copper
zinc
lanthanides
actinides
aluminum
boron
alloy

Subobjectives/Activities

Subobjectives

A. Identify and describe properties of metals from the periodic table.
B. Identify properties of alkali and alkaline metals.
C. Identify properties and uses of the iron family.
D. Identify properties and uses of the copper family.
E. Identify properties and uses of the zinc family.
F. Identify properties and uses of lanthanides, actinides, aluminum, and boron.
G. Identify some common alloys and their uses.

Activities

1. Write a report on a particular metal. Identify its properties and uses.

2. Use a flame test to identify a metal.

3. Write a report on ways to prevent mercury pollution.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 3

CAPTIONED FILM

F1042 The Alkali Metals

PM16 Identify the properties of nonmetals and explain how each is used.

UNIT TOPIC: Nonmetals

ESTIMATED DURATION
1-2 weeks

Vocabulary

nitrogen
oxygen
halogen
noble gases

Subobjectives/Activities

Subobjectives

A. Identify some nonmetals from the periodic table.
B. Identify properties of the nitrogen family.
C. Identify properties of the oxygen family.
D. Identify properties of the halogen family.
E. Identify properties of the noble gases.

Activities

1. Make charts for each nonmetal family. List their properties, elements, and symbols.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 3

PM17 Identify properties of the carbon family members.

UNIT TOPIC: The Carbon Family

ESTIMATED DURATION
1-2 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
carbon	Subobjectives:	
silicon	A. Identify members of the carbon family.	**TEXTBOOK**
germanium	B. Identify uses of different members of the carbon family.	
tin	C. Identify properties and uses of silicon.	Focus on Physical Science,
lead	D. Identify the properties and uses of germanium, tin, and lead.	Unit 3
	Activities:	
	1. Write a report on one member of the carbon family. Identify its properties and uses.	

PM18 Investigate the properties and uses of organic compounds.

UNIT TOPIC: Organic Compounds

ESTIMATED DURATION
1-2 weeks

Vocabulary	**Subobjectives/Activities**	**Materials**
organic compound	Subobjectives: A. Define an organic compound. B. Give reasons why there are so many carbon compounds. C. Explain the importance of carbon compounds in living things. D. Identify some uses of important organic compounds. Activities: 1. Collect and display products made from petroleum. 2. Find out how plastics are made. 3. Find out how soaps work. How do they differ from detergents? 4. Make a list of common organic compounds and their uses.	**TEXTBOOKS** Focus on Physical Science, Unit 3 S.F. Physical Science, Unit 4, Chapter 15

PM19 Describe how solutions are formed and how they are used.

UNIT TOPIC: Solutions

ESTIMATED DURATION
1-2 weeks

Vocabulary

solution
solvent
suspensions
concentrate
saturate
solutes
dissolve

Subobjectives/Activities

Subobjectives:

A. Distinguish among three types of solutions.
B. Describe the solution process and the factors that assist the process.
C. Discuss the properties of solutions. Define solvents and solutes.
D. Identify several kinds of suspensions.
E. Identify uses of common solutions.

Activities:

1. Investigate common liquids such as vinegar, vegetable oil, and water to find out what substances they will dissolve. Use salt, sugar, flour, baking soda, and other cooking ingredients as solutes.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 4

S.F. Physical Science, Unit 4

Maps, Level 7, Chapter 9

CAPTIONED FILM
F691 How Things Dissolve

OTHER MATERIALS
SAVI Science Kit: Mixtures and Solutions

PM20 Investigate different types of chemical reactions.

UNIT TOPIC: Chemical Reactions

ESTIMATED DURATION
2-3 weeks

Vocabulary

decomposition
synthesis
displacement
preservative
chemical reactions
chemical equation
balanced
exothermic
endothermic
catalyst
inhibitor

Subobjectives/Activities

Subobjectives:

A. Define and describe synthesis and displacement reactions.
B. Explain the use of chemical equations and why they must be balanced.
C. Distinguish between exothermic and endothermic reactions.
D. Define and explain the role of catalysts and inhibitors.

Activities

1. Practice writing and balancing chemical equations.

2. Identify some common preservatives in foods. Discuss the benefits and risks of using preservatives.

Materials

TEXTBOOKS

Focus on Earth Science, Unit 4

S.F. Physical Science, Unit 4

MAPS, Level 8, Chapter 7

CAPTIONED FILM
F602 A Look at Chemical Change

OTHER MATERIALS
SAVI Science Kit:
Kitchen Interactions

PM21 Identify the properties of common acids, bases, and salts.

UNIT TOPIC: Acids, Bases, and Salts

ESTIMATED DURATION
2 weeks

Vocabulary

acid
base
indicator
neutral

Subobjectives/Activities

Subobjectives:

A. Identify properties of acids and bases.
B. Compare and contrast properties of acids and bases.
C. Identify some common indicators and describe their uses.
D. Given the pH for several substances, identify them as acids, bases, or neutral.
E. Explain the neutralization process for acids and bases.

Activities

1. Investigate acid rain. Where does it come from and how does it affect the environment? Write a report.

2. Use common indicators to determine the pH level of various substances.

3. Given the pH of a substance, classify it as acidic, basic, or neutral.

4. Experiment to neutralize some acids.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 4

S.F. Physical Science, Unit 4

MAPS, Level 7, Chapter 10

OTHER MATERIALS

SAVI Science Kit:
Kitchen Interactors

PM22 Explore careers in chemistry and related fields: chemist, chemical technician, assayer, radiation therapist, metallurgist, biochemical technician, pharmacist, medical researcher, welder, cosmetologist, etc.

UNIT TOPIC: Careers in Chemistry

ESTIMATED DURATION
2-3 days

Vocabulary	**Subobjectives/Activities**	**Materials**
	Activities	**TEXTBOOKS**
	1. Ask a chemist to visit the class and talk about his or her job and other careers in chemistry.	*Focus on Physical Science*, Pages 212, 234
	2. Write a report on one job in the field of chemistry.	S.F. *Physical Science*, page 226
		CAPTIONED FILMS F1027 Is a Career in Industrial Chemistry for You? F1036 Is a Career in Iron and Steel for You?

E10 Investigate waves, their motion and properties, and the electromagnetic spectrum.

UNIT TOPIC: Investigating Wave Energy

ESTIMATED DURATION
2 weeks

Vocabulary

wave
length
amplitude
frequency
velocity
reflection
refraction
electromagnetic spectrum
X-rays
ultra-violet rays
infared rays
microwaves
radio waves
transmit

Subobjectives/Activities

Subobjectives:

A. Identify and define the characteristics of a wave (length, amplitude, frequency, velocity).
B. Differentiate between reflection and refraction waves.
C. Identify the kinds of waves in the electromagnetic spectrum.
D. Investigate X-rays, ultra-violet rays, and infared rays.
E. Identify uses of microwaves.
F. Explain how radio waves are used to transmit sound.

Activities:

1. Make a colored chart of the electromagnetic spectrum. List the different kinds of waves with important facts about each.

2. Build a radio from a kit.

3. Research the harmful effects of radiation. Write a report.

4. Research microwave pollution. Write a report.

Materials

TEXTBOOKS

Focus on Physical Science,
Unit 5
S.F. Physical Science,
Unit 5

CAPTIONED FILM
F701 A Light Beam Named Ray

E11 Identify the properties of visible light.

UNIT TOPIC: Properties of Light

ESTIMATED DURATION
1-2 weeks

Vocabulary

refraction
prism
light
spectrum
wave length
filter
focal length
focal point
retina
image

Subobjectives/Activities

Subobjectives:

A. Describe the characteristics of light.
B. Investigate the refraction properties of mirrors.
C. Describe the use of a prism to produce the visible light spectrum.
D. Identify the spectrum of colors in order of increasing wave length.
E. Describe how people see color.

Activities:

1. Make a periscope using a shoe box and two pocket mirrors. Tape the mirrors at 45 degree angles at opposite ends of the box. Cut a window opposite each mirror. Then tape the cover on. Use the periscope to see around corners.

2. Survey people to learn their favorite colors. Report on your results.

3. Research how colors affect people's moods. Write a report.

4. Darken the room. Pass a narrow beam of white light through a prism to form a spectrum on white cardboard or a screen. In what order do you see the colors?

5. Investigate color blindness. Test your school population for color blindness.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 5
S.F. Physical Science, Unit 5

MAPS, Level 8,
Chapters 10, 11, 12, 13

CAPTIONED FILMS
F1086 A Simple Lens
F701 A Light Beam Named Ray

FILMSTRIPS
Finding Out About Light (SVE)
What Do You See in Light and Shadow? (EB)
How Light Helps Us (FH)
Bouncing and Bending Light (FH)
Light and How It Travels (JH)
Light and Color (JH)

BOOK
Adler, Irving, Secret of Light

E12 Investigate the use of lenses.

UNIT TOPIC: Investigating Lenses

ESTIMATED DURATION
1-2 weeks

Vocabulary

lens
convex
concave
microscope
photography
laser
optical fibers

Subobjectives/Activities

Subobjectives:

A. Distinguish between the properties of convex and concave lenses.
B. Describe how lenses are used to correct vision.
C. Explain how telescopes and microscopes work.
D. Describe the uses of lenses in photography.
E. Investigate how lasers work and their uses.
F. Explore the uses of optical fibers.

Activities:

1. Make a pin-hole camera.
2. Experiment with water-drop lenses.
3. Make a periscope (See directions in E11).
4. Invite an optometrist to class to explain how lenses are used to correct vision.
5. Research and report on lasers--how do they work and what are they used for?
6. Research and report on the use of optical fibers in medicine.
7. Diagram a telescope or microscope to show how it works.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 5

S.F. *Physical Science*, Unit 5

MAPS), Level 8, Chapter 11

ESS, "Optics"

CAPTIONED FILMS

KSF88	The Microscope
F1086	The Simple Lens
F787	Lasers: An Introduction
F701	A Light Beam Named Ray

BOOK

Lewis, Bruce, *What Is a Laser?*

E13 Investigate the properties of sound.
(See OBJECTIVE S08 in Sound and Hearing.)

UNIT TOPIC: Investigating Sound Energy **ESTIMATED DURATION**

Vocabulary	**Subobjectives/Activities**	**Materials**
	Use Objective S08 of Sound and Hearing.	

510

E14 Investigate heat energy.

UNIT TOPIC: Investigating Heat Energy

ESTIMATED DURATION
1 week

Vocabulary

potential energy
kinetic energy
expansion
contraction

Subobjectives/Activities

Subobjectives
A. Distinguish between potential and kinetic energy.
B. Describe the relationship between temperature and heat.
C. Describe how a thermometer works (expansion/contraction).
D. Discuss how heat affects gases (expansion/contraction).

Activities
1. Define heat and temperature. Discuss how they are related.
2. Make your own thermometer.
3. Explain how a thermostat works.
4. Discuss how a calorimeter works.

Materials

TEXTBOOKS
S.F. Physical Science, Unit 2

Focus on Physical Science, Unit 6

MAPS, Level 7, Chapter 14

CAPTIONED FILMS
F688 Heat for Beginners
F1567 Studying Heat and Its Behavior

OTHER MATERIALS
SAVI Science Kit: Measurement

E15 Investigate heat transfer and its uses.

UNIT TOPIC: Investigating Energy Transfer

ESTIMATED DURATION
1 week

Vocabulary

conduction
convection
radiation
insulation
transfer
thermal pollution

Subobjectives/Activities

Subobjectives:

A. Differentiate among conduction, convection, and radiation in heat movement.
B. Explore the use of insulation in heat transfer.
C. Identify various heating systems.
D. Discuss conservation of heat and thermal pollution.
E. Explain the role of evaporation in cooling systems.

Activities:

1. Investigate thermal pollution. Write a report.
2. Find out the R values of different kinds of insulation for the home. Figure the fuel costs that can be saved by installing home insulation.
3. Do a survey to find out the kinds of heating systems people have in their homes. Compare the costs of each type.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 6
S.F. Physical Science, Unit 2

MAPS, Level 7, Chapter 14

OTHER MATERIALS

SAVI Science Kit: Environmental Energy

E16 Investigate electricity and electron transfer.

UNIT TOPIC: Investigating Electricity

ESTIMATED DURATION
2-3 weeks

Vocabulary

electrical charge
positive
negative
static electricity
resistance
parallel
series
circuits
generator
amplifier
cathode-ray tube
transistor
integrated circuit
computer

Subobjectives/Activities

Subobjectives:

A. Identify different kinds of electrical charges; list their characteristics.
B. Identify conductors and insulators of static electricity.
C. Discuss resistance and how it is measured.
D. Compare parallel and series circuits.
E. Investigate the use of generators, amplifiers, Cathode-ray tubes, television receivers, transistors, integrated circuits, computers.

Activities:

1. Report on the nature of lightning.
2. Find out how and why static charges are prevented.
3. Make series and parallel circuits. Compare them.
4. Calculate the monthly cost of electricity based on the cost per kilowatt hour.
5. Visit an electric power plant to learn how electricity is generated .
6. Take apart an electric motor and identify its parts.

Materials

TEXTBOOKS
S.F. Physical Science, Unit 6

Focus on Physical Science, Unit 6

CAPTIONED FILMS
F540 Electricity
F770 " —Handle With/Care
F120 " —Principles of Safety

FILMSTRIPS
Current Electricity (FH)
How Electricity Helps Us (FH)
Public Utilities in a Big City
Magnets and Electricity (SVE)
Communication by Electricity
Finding Out about Electricity
Elements of Electrical Circuits

BOOKS
Buehr, Walter, Wonder Workers The Story of Electricity
Lewellen, J., Understanding Electronics
Freeman, Ira, All About Electricity

OTHER MATERIALS
Study Print: The Nature of Energy
SAVI Science Kit: Magnetism/Electricity
Information from local power company.

E17 Investigate magnetic energy.

UNIT TOPIC: Investigating Magnetic Energy

ESTIMATED DURATION
1 week

Vocabulary

magnet
magnetic field

Subobjectives/Activities

Subobjectives:
A. Identify and describe the properties and behavior of magnets.
B. Explain how magnetic fields are formed.

Activities:
1. Make an electromagnet.

2. Find out how magnets are used in tools and in machinery with motors.

3. Demonstrate the pattern of magnetic lines of force with a bar magnet and iron filings.

Materials

TEXTBOOKS

Focus on Physical Science, Unit 6
S.F. Physical Science, Unit 6

CAPTIONED FILMS
F7 Electromagnets: How They Work
F556 Magnets and Their Uses
F557 Magnets for Beginners

FILMSTRIPS
Magnets (JH)
Magnets and Electricity (SVE)
The Mysterious Magnet (PH)
Whys of Elementary Science: Electricity and Magnets (FH)

OTHER MATERIALS
SAVI Science Kit: Magnetism and Electricity

E18 Investigate the properties of nuclear radiation.

UNIT TOPIC: **Investigating Nuclear Radiation**

ESTIMATED DURATION
1-2 weeks

Vocabulary

radioactive
elements
decay
half-life
radiation
fusion
fission

Subobjectives/Activities

Subobjectives:

A. Define radioactive and list their properties.
B. Define radioactive decay and half-life. Explain how they are used to determine the age of very old materials.
C. Describe methods of detecting radiation.
D. Define and compare fusion and fission.

Activities

1. Find out how radiation is used in treating disease. Write a report.

2. Investigate the accidents at Three-Mile Island or at Chernobyl, in Russia. Write a report.

3. Read a biography of Marie Curie. Write a report.

Materials

TEXTBOOKS
Focus on Physical Science, Unit 6
CAPTIONED FILM
F1530 Nuclear Energy: The Question Before Us

FIELD TRIP
Nuclear power plant

E19 Investigate energy alternatives.

UNIT TOPIC: Investigating Alternative Sources of Energy

ESTIMATED DURATION
1-2 weeks

Vocabulary

- fossil fuel
- synthetic
- solar energy
- hydroelectric power
- tidal power
- geothermal energy
- nuclear reactor
- thermonuclear power
- alternative

Subobjectives/Activities

Subobjectives:

A. Identify fossil fuels and explore their uses.
B. Define synthetic fuels and explore their uses.
C. Define solar energy and explore its use.
D. Discuss the uses of hydroelectric power, wind power, tidal power, geothermal energy, nuclear reactors, and thermonuclear power.

Activities

1. Research and report on one alternate source of energy.

2. Have a classroom debate on the advantages and disadvantages of using particular energy sources.

3. Discuss problems of nuclear waste disposal.

4. Discuss energy conservation.

Materials

TEXTBOOKS
Focus on Physical Science, Unit 6
S.F. Physical Science, Unit 7

CAPTIONED FILMS

F1530	Nuclear Energy: The Question Before Us
MF77	Toast (energy crisis)

OTHER MATERIALS
Saving Energy (Nat. Geo. kit)
SAVI Science Kit: Environmental Energy

522

521

E20 Explore careers in the field of energy: petroleum engineer, nuclear plant technician, uranium mine inspector, laser scientist, lens maker, studio engineer, computer programmer, electronics technician, telephone technician, electrical engineer, radiation therapist, etc.

UNIT TOPIC: Careers in Energy

ESTIMATED DURATION
1-2 weeks

Vocabulary	Subobjectives/Activities	Materials
		TEXTBOOKS Focus on Physical Science, pages 342, 446, 448, 490 S.F. Physical Science, pages 378, 434 **CAPTIONED FILMS** F1028 Is a Career in the Electric Power Industry for You? F1035 Is a Career in Atomic Energy for You? F1038 Is a Career in Mining, Petroleum, or Gas Production for You? F363 So You Want to be an Electronics Technician

APPENDICES

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APPENDIX A. GLOSSARY

Anthropomorphic questions: Questions that attribute human characteristics to natural phenomena.

Behavior: The observed response of an individual to a stimulus.

Classification: A higher cognitive process than grouping. The arrangement or distribution of objects or events according to a method or system. The process of classifying is based on observing relationships between objects or events.

Communication: The transmission of data from observations. This process may include verbal and signed communication as well as written records of observations, such as graphs, tables, or charts.

Concept: An idea generalized from particular relevant experience.

Convergent thinking and questioning: The type of thinking needed to arrive at the right answer from remembered information. Convergent questions allow for a limited number of responses and move toward a conclusion.

Critical thinking processes: The cognitive abilities that the mind can perform; hypothesizing, comparing, inferring, classifying, controlling variables, etc.

Divergent thinking and questioning: The type of thinking needed to arrive at at new or unique answer, not necessarily based on remembered information. Divergent questions allow for a wide variety of answers.

Experimentation: An investigation to test a hypothesis, in which there is both a control and a variable.

Grouping and sorting: Placing objects in a group based on some common property such as size, color, or shape.

Hypothesizing: The mental process of formulating a question or statement that can be tested in a controlled experiment.

Inferring: The mental process of observing facts directly or indirectly, then trying to explain their meaning. Inferences may or may not be valid, depending on the adequacy of the observation.

Inquiry: The process of investigating a problem—thinking about a problem and developing strategies for finding information to solve it. There is no set pattern for inquiry; intuitive approaches may be used. Discoveries may result from inquiry.

Investigation: A search for or gathering of information. Investigation resembles experiment, but lacks controls.

Measuring: A quantitative description of such properties as length, area, weight, temperature, etc. Standard or nonstandard units may be used for measurement. Selection and use of the appropriate measuring tool is an important part of measurement.

Observing: The use of one or more senses in contact with objects, events, or organisms. Observations are influenced by the background and previous experience of the observer.

Predicting: The mental process of suggesting what may occur in the future, based on information acquired through observation. The accuracy of a prediction is affected by the adequacy of the observation.

Problem-solving: All mental and experimental activities involved in setting up a hypothesis, experimenting to test the hypothesis, and reaching conclusions based on the experiment.

Scientific principle: A generalization of science involving several related science concepts.

Teleological questions: Questions implying that natural phenomena have purposes in mind.

APPENDIX B. BIBLIOGRAPHY

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Earth Science. IL: Scott, Foresman & Co., 1983

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Focus on Earth Science. OH: Charles E. Merrill Publishing Co., 1984

Focus on Life Science. OH: Charles E. Merrill Publishing Co., 1984

Focus on Physical Science. OH: Charles E. Merrill Publishing Co., 1984

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Life Science. IL: Scott, Foresman & Co., 1983

Physical Science. IL: Scott, Foresman & Co., 1983

Science. IL: Scott, Foresman & Co., 1983

Science. MA: Houghton Mifflin Co., 1979.

APPENDIX C. SUPPLIERS AND RESOURCES

Science Supply Houses

Carolina Biological Supply Co.
2700 York Road
Burlington, NC 27215

Central Scientific Co.
Cenco Center, 2600 Kostner Ave.
Chicago, IL 60623

Creative Playthings
PO Box 1100
Princeton, NJ 08540

Delta Education
PO Box M
Nashua, NH 03061

Fisher Scientific Co.
4901 W. LeMoyne Street
Chicago, IL 60651

Frey Scientific Co.
905 Hickory Lane
Mansfield, OH 44905

Learning Things, Inc.
Littleton, MA 01460

Ohaus
29 Hanover Road
Florham Park, NJ 07932

Sargent-Welch
7300 N. Linder Ave.
Skokie, IL 60077

Science Kit, Inc.
777 East Park Dr.
Tonawanda, NY 14501

Ward's Natural Science Establishment, Inc.
Box 1712
Rochester, NY 14603

Filmstrip Distributors

AP	American Petroleum	BFA	Bailey Film Assn.
CF	Captioned Films	CP	Children's Press
C	Clearvue, Inc.	CO	Coronet Films
EB	Encyclopedia Britannica	EFP	Educational Filmstrip Press
EGH	Eye Gate House	ERS	Educational Reading Service
HMS	H.M. Stone Productions	JH	Jam Handy, Inc.
LPP	Leonard Peck Productions	MDC	Multi-Dimensional Comm.
MES	Museum Extension Services	MGH	McGraw-Hill Filmstrips
NGS	National Geographic Society	PH	Pomfret House
PS	Popular Science Publishing	SVE	Society for Visual Education
TA	Troll Associates	VE	Visual Education, Inc.
WD	Walt Disney Productions	WR	My Weekly Reader

Materials for the Science Classroom

This list of frequently-used science resources was generated by a group of science teachers at the Kendall Demonstration Elementary School. While it is not an exhaustive list, it includes most of the materials needed to teach science in the elementary grades (K-8).

The materials are grouped in general categories. They are not necessarily used for the purposes listed; most can be used in a wide variety of ways. A piece of wood, for instance, may be an inclined plane one day and the mounting base for an electric circuit the next day.

Most of the listed materials are easily available from a number of sources. Teachers usually acquire these materials as needed for classroom experiments, and should not feel they need all of the listed items to begin teaching. It may take several years to accumulate all the supplies listed here.

Code letters following the category headings indicate where the materials may be found or purchased.

S - Science Supply House (addresses on page xx.)
H - Hardware Store
G - Grocery Store
O - Office Supply
C - Collected (Creative scrounging)
D - Drugstore
A - Art Supply

Science Equipment (S,H,D,G)

- hand-held magnifiers (assorted sizes)
- models—biological, physical, geological
- charts—biological, physical, geological
- maps and globes
- candles
- prepared slides of assorted organisms, cells, tissues, etc.
- eye droppers
- petroleum jelly
- preserved specimens
- iron filings
- safety goggles
- Petri dishes
- Bunsen burners
- simple machines—pulleys, gears, wheels and axles, levers, screws, ramps, etc.
- fire extinguisher
- litmus paper
- microscopes
- microscopic slides, slide covers
- mirrors
- prisms
- rubber aprons
- tongs
- tuning forks
- magnets—bar, horseshoe, U-shaped, rod, etc.
- mineral identification kits
- first aid kit
- latex gloves
- dissecting kits and pans
- rubber tubing
- hot plates
- eye wash equipment

Basic Chemicals (S,D)

- rubbing alcohol
- baking soda
- BTB solution
- distilled water
- formaldehyde
- iodine stain
- magnesium ribbon
- nitric acid
- quinine sulfate
- sodium hydroxide
- sulfur crystals
- Wright's stain
- zinc sulfate
- ammonia
- Benedict's solution
- copper sulfate
- Epsom salts
- hydrocholoric acid
- limestone solution
- methylene blue stain
- phenolphthalein
- salt
- sugar
- white vinegar
- zinc strips

Plant Supplies (D,H)

sand, soil, rocks
assorted seeds
plant pots (assorted sizes)
watering can
plant stakes
trowels
shovel, hoe
alligator clips

Electrical Equipment (H,D)

switches
assorted batteries
flashlights
light bulbs and sockets
bell wire
copper wire
small lamps

Animal Equipment (D,H,Pet Store)

aquariums
aquarium filter carbon, cotton
plastic tubing
pH test kit
incubator
ant farm
animal feeding dishes
rocks for terrariums
aquarium heaters, lights, filters, pump
aquarium rocks
fish nets
anti-chlorine tablets
animal water bottles
animal cages
terrariums
mason jars with screen lids (for insect cages)

Measuring Supplies (H,D,S)

thermometers—Celcius and Fahrenheit
oral thermometers
test tubes
metric rulers
measuring cups and spoons
assortment of beakers, flasks
metric tape measures
assorted scales and balances
bathroom scales
metric weights
compasses
funnels—assorted sizes

Art Supplies (A,D,H)

paint—assorted colors
modeling clay
plaster of paris
marking pens
masking tape
colored construction paper
wax
paint brushes
papier mache'
pipe cleaners
string, yarn, thread
graph paper

Tools and Utensils (H,D,G,C)

- can openers
- screws, nails, bolts, nuts, washers
- hammers, saws, files
- screwdrivers—Phillips, flathead
- soldering iron, solder, paste, wire
- wire cutters and strippers
- glass cutter
- silverware
- sharp knife
- sandpaper
- clamps
- level and T-square
- pliers
- tweezers

Grocery Items (G,D)

- salt
- food colors
- vanilla extract
- cooking oil
- popcorn
- Lifesaver candy
- petroleum jelly
- corn starch
- plastic bags
- tissues
- paper cups
- steel wool
- cotton balls
- sugar—granulated and cubes
- syrup, honey
- pasta
- beans—kidney, mung, etc.
- variety of grains
- alum
- baking soda
- vinegar
- waxed paper
- paper towels
- drinking straws
- aluminum foil
- paper bags

Cleaning Supplies (G,H)

- sponges
- laundry bluing
- soaps, detergent
- Borax
- mop, broom
- bucket
- dishpan
- cheescloth

Containers (C)

- egg cartons
- metal coffee cans
- aluminum pie tins
- pitchers
- plastic bowls
- pill bottles
- plastic bags
- shoe boxes
- glass jars (esp. large peanut butter, mayonnaise jars)
- divided plastic food containers
- milk cartons, various sizes
- margarine, cheese tubs
- assorted cardboard containers

Miscellaneous (C)

bottlecaps
shells
pennies
toothbrushes
assorted beads
old machines—clocks, radios, typewriters, etc.
scraps of cloth
cardboard (assorted sizes)
matches
pine cones
crayons
buttons, poker chips, jacks, chessmen
fishing line
assorted balls
old ceramic tiles
egg beater
toothpicks, dowels, popsicle sticks
marbles
newspapers, animal magazines
rocks
assorted building blocks
old toys
clothespins
balloons
corks
feathers
pieces of wood
hangers
rope, twine
rubber bands
rubber stoppers
pins, needles
safety pins
hairpins

APPENDIX D. STUDENT RECORD SHEETS

I. Science Level and Textbook Chart

Write information in appropriate spaces on the chart; keep with student's permanent record.

II. Cumulative Progress Charts

Use the following key to indicate student progress on the chart:

☐ not taught ⧄ partially learned ■ learned

III. Yearly Progress Charts for Knowledge and Skills Objectives

A. To mark the Knowledge Objectives, locate the grade level and current objective.
B. Indicate the level of student achievement for each subobjective of that unit.

☐ not taught ⧄ partially learned ■ learned

1. If the student has completed all or most of the subobjectives, the terminal objective may also be marked "learned," as follows:

   PM01 (terminal objective) ■ subobjectives |A|B|C|D|E|F|G|H|

2. If the student has learned or partially learned at least half of the subobjectives, mark the terminal objective as "partially learned," for example:

   PM01 (terminal objective) ⧄ subobjectives |A|B|C|D|E|F|G|H|

3. If the student has learned fewer than half of the subobjectives, then the terminal objective should remain unmarked, as follows:

   PM01 (terminal objective) ☐ subobjectives |A|B|C|D|E|F|G|H|

C. Mark the Process Skills using the same system to indicate how well the student demonstrated each skill while working on science units throughout the year.

KDES

Level and Textbook Record
SCIENCE

Student's Name________________________________ Birthdate__________

School Year	Department	Curric Level	Textbook Publisher	Text Level	Teacher

KDES

Cumulative Progress Chart
SCIENCE--KNOWLEDGE OBJECTIVES

Student's Name________________________________ Birthdate__________

LEVEL	PROPERTIES OF MATTER	ENERGY	FORCE, WORK & MOTION	GEOLOGY	CLIMATOLOGY OCEANOGRAPHY	ASTRONOMY	PLANTS & ANIMALS	HUMAN GROWTH & REPRODUCTION	HEALTH SAFETY & NUTRITION	SOUND & HEARING
1	PM01 ☐ PM02 ☐ PM03 ☐		F01 ☐	G01 ☐		A01 ☐ A02 ☐	PA01 ☐ PA02 ☐ PA03 ☐ PA04 ☐ PA05 ☐ PA06 ☐ PA07 ☐ PA08 ☐ PA09 ☐			
2	PM04 ☐	E01 ☐ E02 ☐			C01 ☐ C02 ☐	A03 ☐	PA10 ☐ PA11 ☐	HGR01 ☐ HGR02 ☐	HSN01 ☐ HSN02 ☐ HSN03 ☐	S01 ☐ S02 ☐ S03 ☐
3	PM05 ☐ PM06 ☐	E03 ☐	F02 ☐ F03 ☐ F04 ☐ F05 ☐	G02 ☐ G03 ☐	C03 ☐ C04 ☐	A04 ☐ A05 ☐	PA12 ☐ PA13 ☐ PA14 ☐ PA15 ☐	HGR03 ☐		
4		E04 ☐ #E05 ☐ E06 ☐	F06 ☐	G04 ☐ G05 ☐ G06 ☐	C05 ☐	A06 ☐	PA16 ☐ PA17 ☐ PA18 ☐ PA19 ☐	HGR04 ☐ HGR05 ☐	HSN04 ☐ HSN05 ☐ HSN06 ☐ HSN07 ☐	#S04 ☐ S05 ☐ S06 ☐ S07 ☐
5	PM07 ☐ PM08 ☐	E07 ☐ E08 ☐	F07 ☐ F08 ☐ F09 ☐ F10 ☐	G07 ☐ G08 ☐	C06 ☐ C07 ☐	A07 ☐ A08 ☐	PA20 ☐ PA21 ☐ PA22 ☐	HGR06 ☐	HSN08 ☐	
6	PM09 ☐ PM10 ☐	E09 ☐				A09 ☐	PA23 ☐ PA24 ☐ PA25 ☐ PA26 ☐	HGR07 ☐ HGR08 ☐ HGR09 ☐	HSN09 ☐	
								*HGR16 ☐ *HGR17 ☐	*HSN10 ☐ *HSN11 ☐ *HSN12 ☐	*S09 ☐ *S10 ☐

* Starred objectives are from the Middle School curriculum. They should be completed by students who will go directly into high school programs without completing a Middle School curriculum.

# E05 and S04 are the same objective.

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Student________________________________

Knowledge Skills Objectives

Science
Cumulative Progress Chart

LEVEL	PROPERTIES OF MATTER	ENERGY	FORCE, WORK & MOTION	GEOLOGY	CLIMATOLOGY OCEANOGRAPHY	ASTRONOMY	PLANTS & ANIMALS	HUMAN GROWTH & REPRODUCTION	HEALTH SAFETY & NUTRITION	SOUND & HEARING
7 LIFE SCIENCE							PA27 ☐ PA28 ☐ PA29 ☐ PA30 ☐ PA31 ☐ PA32 ☐ PA33 ☐ PA34 ☐ PA35 ☐ PA36 ☐ PA37 ☐ PA38 ☐ PA39 ☐ PA40 ☐	HGR10 ☐ HGR11 ☐ HGR12 ☐ HGR13 ☐ HGR14 ☐ HGR15 ☐ HGR16 ☐ HGR17 ☐ HGR18 ☐ HGR19 ☐	HSN10 ☐ HSN11 ☐ HSN12 ☐ HSN13 ☐	#S08 ☐ S09 ☐ S10 ☐ S11 ☐
8 EARTH SCIENCE				G09 ☐ G10 ☐ G11 ☐ G12 ☐ G13 ☐ G14 ☐ G15 ☐ G16 ☐ G17 ☐ G18 ☐ G19 ☐ G20 ☐ G21 ☐ G22 ☐	C08 ☐ C09 ☐ C10 ☐ C11 ☐ C12 ☐	A10 ☐ A11 ☐ A12 ☐ A13 ☐ A14 ☐ A15 ☐				
9 PHYSICAL SCIENCE	PM11 ☐ PM12 ☐ PM13 ☐ PM14 ☐ PM15 ☐ PM16 ☐ PM17 ☐ PM18 ☐ PM19 ☐ PM20 ☐ PM21 ☐ PM22 ☐	E10 ☐ E11 ☐ E12 ☐ #E13 ☐ E14 ☐ E15 ☐ E16 ☐ E17 ☐ E18 ☐ E19 ☐ E20 ☐	F11 ☐ F12 ☐ F13 ☐ F14 ☐							

S08 and E13 are the same objective

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PM01 ☐ Compare and classify solid objects according to property: size, color, shape, weight, density, taste, and texture

A	B	C	D	E	F	G	H

PM02 ☐ Describe objects according to their properties

A	B	C	D	E

A01 ☐ Describe the positions of objects relative to a specific reference point

A	B	C	D

PM03 ☐ Classify objects according to multiple characteristics

A	B	C	D

PA01 ☐ Identify objects as living or nonliving and state some characteristics of each

A	B	C	D

PA02 ☐ Identify and describe the way animals and plants move

A	B	C

PA03 ☐ Identify the needs of animals for healthy growth and development

A	B	C

PA04 ☐ Identify uses of animals

A	B	C	D

G01 ☐ Describe some characteristics of rocks and soil

A	B	C

PA05 ☐ Observe and identify a variety of animals that live in different habitats

A	B	C	D	E	F	G

PA06 ☐ Identify animal homes and describe where and how they are constructed

A	B	C	D	E

Student ______________________________ **Science, Level 1**

KNOWLEGE OBJECTIVES

F01 ☐ Identify kinds of magnets and the objects they attract

A	B	C	D

PA07 ☐ Observe and identify a variety of plants and tell where they grow

A	B	C	D	E

PA08 ☐ Identify the needs of plants for healthy growth and development, and describe what happens when these needs are not met

A	B	C

PA09 ☐ Identify some parts of plants

A	B	C	D

A02 ☐ Identify and describe objects in the sky

A	B	C	D

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ________________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PA10 ☐ Describe the life cycle of some familiar animals
A B C D

PA11 ☐ Identify body parts of animals and describe their functions
A B C D E

S01 ☐ Identify different sounds in the environment and how they are produced
A B C D E F

S02 ☐ Identify causes of deafness and its implications
A B C D

S03 ☐ Explain the use and care of a hearing aid
A B C D

PM04 ☐ Measure and compare objects and events using nonstandard and standard units
A B C D E

HGR01 ☐ Identify and describe what humans need for growth and development (food, air, water, shelter, exercise, love)
A B C

HGR02 ☐ Identify the body structures of people and describe their functions
A B C D

HSN01 ☐ Identify and describe good health practices
A B C D E F

HSN02 ☐ Identify and describe good safety practices
A B C D E F G

HSN03 ☐ Identify reasons and procedures for taking medicines
A B C D

E01 ☐ Identify forms of energy, their sources, and uses
A B C D E

Student ______________________________ **Science, Level 2**

KNOWLEDGE OBJECTIVES

E02 ☐ Identify sources of heat and ways to measure it

A	B	C	D	E	F	G	H

A03 ☐ Investigate shadows and light

A	B	C	D	E	F	G

C01 ☐ Observe, name, and record daily changes in weather

A	B

C02 ☐ Identify and describe distinct features of the four seasons

A	B	C	D

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PA12 ☐ Describe the life cycle of some familiar plants
A B C D

PA13 ☐ Identify parts of plants and describe their functions
A B C D E F G H

F02 ☐ Describe work in terms of pushes and pulls
A B C D

F03 ☐ Identify characteristics of objects in motion and at rest
A B C D E F

F04 ☐ Identify and describe three simple machines
A B C D E F G

F05 ☐ Identify some common machines and their uses in daily living
A B C

PM05 ☐ Observe and identify the different states of matter
A B C D E

PM06 ☐ Identify the characteristics of the states of matter
A B C

E03 ☐ Identify the characteristics of heat energy
A B C D E F

C03 ☐ Investigate water in the air
A B C D E F G H I J K

C04 ☐ Identify and describe the sources of fresh water on the earth
A B C

PA14 ☐ Identify and describe food chains and food webs and the process of decomposition
A B C D E F G

PA15 ☐ Investigate the factors or variables in several habitats that are suited to the special needs of a particular organism
A B C

Student ____________________________ **Science, Level 3**

KNOWLEDGE OBJECTIVES

G02 ☐ Identify layers of soil and investigate rock formed from layers

A | B | C | D

G03 ☐ Identify rocks and minerals according to their characteristics and formation

A | B | C | D

A04 ☐ Describe day and night in terms of the earth's movements

A | B | C | D

A05 ☐ Describe the characteristics and motion of the moon

A | B | C | D | E

HGR03 ☐ Identify and compare male and female external characteristics

A | B | C

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives ____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

HGR04 ☐ Identify cells, tissues, organs, systems

A	B	C	D

HSN04 ☐ Identify foods in the four basic food groups and the needs they satisfy

A	B	C

HSN05 ☐ Identify how foods and their elements help the body grow

A	B	C	D

HSN06 ☐ Describe dangerous situations and identify what to do in each situation

A	B	C	D	E	F	G

HSN07 ☐ Describe basic first aid procedures for a variety of emergencies

A	B	C	D	E	F

E04 ☐ Identify the characteristics of light energy

A	B	C	D	E	F	G	H	I

HGR05 ☐ Identify the organ of sight and describe how we see

A	B	C	D

A06 ☐ Identify and describe the planets in our solar system

A	B	C	D

G04 ☐ Identify some physical properties of minerals

A	B	C	D

G05 ☐ Identify the uses of and the means of processing rocks, minerals, gems, and other natural resources

A	B	C	D

G06 ☐ Identify fossils and explain how they are formed

A	B	C	D

Student ____________________________ Science, Level 4

PA16 ☐ Investigate the life cycles of animals
A | B | C | D

PA17 ☐ Investigate and describe adaptations of plants and animals
A | B | C | D | E | F

S04
E05 ☐ Identify the properties of sound
A | B | C | D | E

S05 ☐ Identify parts of the ear and their functions
A | B | C | D

S06 ☐ Identify methods of measuring hearing loss
A | B | C | D | E

S07 ☐ Discuss what it means to be hearing impaired
A | B | C | D

C05 ☐ Describe ocean features and resources
A | B | C | D | E | F | G | H

F06 ☐ Investigate magnets and their uses
A | B | C | D | E | F | G | H | I | J

E06 ☐ Identify the characteristics of electric energy
A | B | C | D | E | F | G | H

PA18 ☐ Investigate the life cycles of plants
A | B | C | D | E

PA19 ☐ Identify uses of plants
A | B | C | D | E

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives ____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PA20 ☐ Investigate vertebrate animals

A	B	C	D	E

PA21 ☐ Investigate invertebrate animals

A	B	C	D	E	F	G

PM07 ☐ Measure relative properties of matter using the metric system

A	B	C	D

PM08 ☐ Describe and classify physical and chemical changes in states of matter

A	B	C	D	E

C06 ☐ Describe how air affects our weather

A	B	C	D

C07 ☐ Describe how weather is predicted

A	B	C	D	E	F	G

A07 ☐ Describe the seasons in terms of the earths's movement around the sun

A	B	C	D	E

HGR06 ☐ Identify and describe the four basic body systems that give support and protection, movement, and coordinate all bodily functions

A	B	C	D

HSN08 ☐ Identify drugs, their uses, and effects

A	B	C	D	E	F	G

F07 ☐ Investigate the direction and strength of forces

A	B	C	D	E	F

F08 ☐ Describe the effects of friction on motion

A	B	C	D	E	F

F09 ☐ Measure forces and their effects

A	B	C	D

Student ______________________________ Science, Level 5

KNOWLEDGE OBJECTIVES

F10 ☐ Investigate simple machines and the work they perform

A	B	C	D	E	F

A08 ☐ Describe the characteristics and motions of the stars

A	B	C	D	E	F	G

E07 ☐ Identify two general types of energy and the forms they can take

A	B

E08 ☐ Identify the transmission and transformation of energy from one form to another

A	B	C	D	E

G07 ☐ Identify and describe sudden changes in geographical features

A	B	C

G08 ☐ Describe changes in land over time

A	B	C	D	E	F

PA22 ☐ Investigate how plants are grouped

A	B	C	D	E	F

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PA23 ☐ Identify some protists and explain why they are important
A B C D

HSN09 ☐ Identify common diseases and treatment for them
A B C D E F

PM09 ☐ Identify the properties and structure of matter
A B C D E F G

PM10 ☐ Identify and classify different types of compounds
A B C D

E09 ☐ Identify energy resources and the need for conservation
A B C D

HGR07 ☐ Identify and describe three basic body systems that supply food, oxygen, and water to the cells of your body
A B C

A09 ☐ Explore new discoveries and theories about space
A B C D

PA24 ☐ Identify and describe some ecosystems
A B C D

PA25 ☐ Identify, describe, and compare communities of living things
A B C D E F

HGR08 ☐ Identify and describe the four stages of human development - infant, child, teenager, adult
A B C D E

HGR09 ☐ Investigate the male and female reproductive systems
A B C D E

PA26 ☐ Identify factors that are helpful and harmful to the environment
A B C D E F

Student ____________________ Science, Level 6

KNOWLEDGE OBJECTIVES

The following starred objectives are to be included at level six for students who will not be completing the Middle School curriculum before going into a high school program.

*S09 ☐ Discuss similarities and differences among hearing-impaired people

A	B	C	D	E

*S10 ☐ Discuss scientific advances in the area of deafness

A	B	C	D

*HGR16 ☐ Investigate the human reproductive system

A	B	C	D	E	F	G

*HGR17 ☐ Describe pregnancy and the stages of prenatal development

A	B	C	D	E	F

*HSN10 ☐ Explain how the nutrients in food are used by the body

A	B	C	D	E	F	G	H	I

*HSN11 ☐ Identify the causes and prevention of disease

A	B	C	D	E	F	G

*HSN12 ☐ Investigate substance abuse

A	B	C	D	E	F	G	H	I

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

PA27 ☐ Identify characteristics and activities of living organisms

A	B	C	D	E	F

PA28 ☐ Describe how scientists use classification, measurement, and the scientific method to solve problems

A	B	C	D	E	F	G

PA29 ☐ Identify the basic parts and describe the activities of the cell, and explain how microscopes are used to study cells

A	B	C	D	E	F	G	H

PA30 ☐ Identify and describe the characteristics of animals classified in the invertebrate phyla

A	B	C	D	E	F	G	H	I	J

PA31 ☐ Identify and describe the characteristics of animals classified in phylum Chordata

A	B	C	D	E	F	G

PA32 ☐ Describe how cells, tissues, organs, and systems work to keep an animal alive

A	B	C	D	E	F

PA33 ☐ Investigate how animals reproduce and the importance of reproduction to the survival of a species

A	B	C	D	E	F	G	H	I

PA34 ☐ Identify the characteristics of different kinds of plants and tell how plants are classified

A	B	C	D	E	F

PA35 ☐ Identify the parts of plants and the function of each part

A	B	C	D	E	F	G	H	I

Student ____________________________

Science, Level 7
Knowledge Objectives

PA36 ☐ Investigate plant reproduction and the reproductive structure of seed plants

| A | B | C | D | E | F | G | H | I | J | K |

PA37 ☐ Identify the characteristics of organisms in each phylum of the protist kingdom

| A | B | C | D | E | F |

PA38 ☐ Identify the characteristics of the various kinds of fungi and monerans

| A | B | C | D | E | F | G | H | I | J | K | L |

PA39 ☐ Investigate how organisms have changed over time

| A | B | C | D | E |

PA40 ☐ Explore careers in the fields of biology and zoology

HGR10 ☐ Identify parts of the human skeletal system and their functions

| A | B | C | D | E | F | G |

HGR11 ☐ Identify parts of the human respiratory system and their functions

| A | B | C |

HGR12 ☐ Identify organs involved in digestion and excretion and their functions

| A | B | C | D |

HGR13 ☐ Identify organs involved in circulation and their functions

| A | B | C | D | E | F | G | H | I | J |

HGR14 ☐ Investigate how the body is controlled and regulated by the nervous system and the endocrine system

| A | B | C | D | E | F | G | H |

HGR15 ☐ Investigate the sense organs

| A | B | C | D | E |

HGR16 ☐ Investigate the human reproductive system

| A | B | C | D | E | F | G |

HGR17 ☐ Describe pregnancy and the stages of prenatal development

| A | B | C | D | E | F |

HGR18 ☐ Investigate the principles of heredity

| A | B | C | D | E | F | G | H |

HGR19 ☐ Explore careers in the field of medicine

Student ____________________________

Science, Level 7
Knowledge Objectives

HSN10 ☐ Explain how the nutrients in food are used by the body

A	B	C	D	E	F	G	H	I

HSN11 ☐ Identify the causes and prevention of disease

A	B	C	D	E	F	G

HSN12 ☐ Investigate substance abuse

A	B	C	D	E	F	G	H	I

HSN13 ☐ Explore careers in health, safety, and nutrition

S08
E13 } ☐ Investigate the properties of sound

A	B	C	D

S09 ☐ Discuss similarities and differences among hearing-impaired people

A	B	C	D	E

S10 ☐ Discuss scientific advances in the area of deafness

A	B	C	D

S11 ☐ Explore careers in deaf education and other related areas

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ________________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

G09 ☐ Identify and analyze the properties of minerals
A | B | C

G10 ☐ Investigate the forces that control the formation and properties of igneous and metamorphic rocks
A | B | C | D | E

G11 ☐ Describe the formation and composition of sedimentary rocks.
A | B | C | D | E | F

G12 ☐ Investigate the agents of erosion
A | B | C

G13 ☐ Describe how river systems are formed and explain the importance of the groundwater system
A | B | C | D

G14 ☐ Describe the work of glaciers in erosion
A | B | C | D

G15 ☐ Describe the forces that cause earthquakes and ways to predict and measure them
A | B | C | D | E | F | G

G16 ☐ Investigate the internal forces that change the surface of the earth
A | B | C | D

G17 ☐ Identify and describe different landforms and the use of topographic maps to identify them
A | B | C | D | E

G18 ☐ Investigate the age of the earth and its history
A | B | C | D | E | F | G

G19 ☐ Identify renewable natural resources and how they are used
A | B | C | D | E | F

G20 ☐ Identify nonrenewable natural resources and how they are used
A | B | C

Student ____________________________

Science, Level 8
Knowledge Objectives

G21 ☐ Describe U.S. energy resources and their use
A B C D E F G H

G22 ☐ Explore careers in the field of geology

C08 ☐ Identify the composition and structure of the atmosphere
A B C D E F G

C09 ☐ Investigate weather and climate
A B C D E F G H I J K

C10 ☐ Investigate the ocean
A B C D E F

C11 ☐ Investigate the movement of water within the ocean
A B C D E

C12 ☐ Explore careers in the fields of climatology and oceanography

A10 ☐ Investigate models to explain the earth
A B C

A11 ☐ Investigate the Earth-Moon System
A B C D E F G H I

A12 ☐ Investigate the universe, galaxies, and stars
A B C D E F G H

A13 ☐ Investigate the motions and bodies of the solar system
A B C D E F G H I J K L

A14 ☐ Investigate space exploration
A B C D

A15 ☐ Explore careers in the field of astronomy

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

Student's Name ______________________________ Goals for (year)__________

Current Functioning Level __________ Level/Grade ______ Department _______

Complete objectives indicated ________ Complete all objectives _____________

Marking key: ☐ not taught ⧄ partially learned ■ learned

KNOWLEDGE OBJECTIVES

F11 ☐ Investigate how machines can change forces and do work

A | B | C | D | E

F12 ☐ Investigate changes in motion resulting from the action of forces

A | B | C | D | E | F

F13 ☐ Investigate Newton's Laws

A | B | C | D

F14 ☐ Explore careers in the field of physics

PM11 ☐ Review the Metric System

A | B | C | D | E

PM12 ☐ Investigate the characteristics of matter and some of its properties

A | B | C | D | E

PM13 ☐ Recognize a periodic table of the elements and use information from the table

A | B | C | D | E

PM14 ☐ Describe compounds and explain how they are formed

A | B | C

PM15 ☐ Identify the characteristics of metals and the use of some important metals.

A | B | C | D | E | F | G

PM16 ☐ Identify the properties of nonmetals and explain how each is used

A | B | C | D | E

PM17 ☐ Identify the properties of the carbon family members

A | B | C | D

PM18 ☐ Investigate the properties and uses of organic compounds

A | B | C | D

Student ____________________________

Science, Level 9
Knowledge Objectives

PM19 ☐ Describe how solutions are formed and how they are used
A | B | C | D | E

PM20 ☐ Investigate different types of chemical reactions
A | B | C | D

PM21 ☐ Identify properties of common acids, bases, and salts
A | B | C | D | E

PM22 ☐ Explore careers in the field of chemistry

E10 ☐ Investigate waves, their motion and properties, and the electromagnetic spectrum
A | B | C | D | E | F

E11 ☐ Identify the properties of visible light
A | B | C | D | E

E12 ☐ Investigate the use of lenses
A | B | C | D | E | F

E13} S08} ☐ Investigate the properties of sound
A | B | C | D

E14 ☐ Investigate heat energy
A | B | C | D

E15 ☐ Investigate heat transfer and its uses
A | B | C | D | E

E16 ☐ Investigate electricity and electron transfer
A | B | C | D | E

E17 ☐ Investigate magnetic energy
A | B

E18 ☐ Identify the properties of nuclear radiation
A | B | C | D

E19 ☐ Investigate energy alternatives
A | B | C | D

E20 ☐ Explore careers in the field of energy

KDES SCIENCE CURRICULUM GUIDE
YEARLY PROGRESS CHART

SCIENCE PROCESS SKILLS

Student's Name ____

Directions: Below each skill objective are three numbered lines, one for each year that a student is in a department. Check the appropriate year the skill was worked on. If a student is in a department for a fourth year, a line may be added.

OBSERVATION SKILLS

<table>
<tr><th>PRIMARY</th><th>INTERMEDIATE</th><th>MIDDLE SCHOOL</th></tr>
<tr><td>SK01 Observe objects using the five senses
1___ 2___ 3___</td><td></td><td></td></tr>
<tr><td colspan="2">SK02 Identify physical characteristics of objects by direct observation.</td><td rowspan="2"></td></tr>
<tr><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td></tr>
<tr><td colspan="3">SK03 Use instruments to observe an object</td></tr>
<tr><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td></tr>
<tr><td rowspan="2"></td><td colspan="2">SK04 Observe repeatedly to accumulate data</td></tr>
<tr><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td></tr>
<tr><td rowspan="2"></td><td colspan="2">SK05 Observe a series of events over a period of time and order them chronologically</td></tr>
<tr><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td></tr>
<tr><td rowspan="2"></td><td colspan="2">SK06 Recognize cause and effect relationships after observing related events</td></tr>
<tr><td>1___ 2___ 3___</td><td>1___ 2___ 3___</td></tr>
</table>

STUDENT ______________________________

SCIENCE PROCESS SKILLS OBJECTIVES

CLASSIFYING SKILLS

<table>
<tr><th>PRIMARY</th><th>INTERMEDIATE</th><th>MIDDLE SCHOOL</th></tr>
<tr><td>SK07 Group objects according to likeness and differences
1___ 2___ 3___</td><td rowspan="2"></td><td rowspan="3"></td></tr>
<tr><td>SK08 Group objects based on single characteristic
1___ 2___ 3___</td></tr>
<tr><td colspan="2">SK09 Group objects based on two or more characteristics
1___ 2___ 3___ ¦ 1___ 2___ 3___</td></tr>
<tr><td rowspan="3"></td><td colspan="2">SK10 Organize data into predetermined categories
1___ 2___ 3___ ¦ 1___ 2___ 3___</td></tr>
<tr><td colspan="2">SK11 Classify data as to the relevancy to a particular investigation
1___ 2___ 3___ ¦ 1___ 2___ 3___</td></tr>
<tr><td></td><td>SK12 Use formal classification systems to identify a plant, animal, rock, or other object
1___ 2___ 3___</td></tr>
</table>

STUDENT________________________________

SCIENCE PROCESS
SKILLS OBJECTIVES

COMMUNICATING SKILLS

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
SK13 Describe an observation through-the-air verbally or pictorially 1___ 2___ 3___		
SK14 Give a verbal or through-the-air description of an object so that others recognize the object 1___ 2___ 3___		
SK15 Describe an observation in writing 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
SK16 Construct graphs to represent data collected 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
	SK17 Describe variables that may have influenced an observation 1___ 2___ 3___	1___ 2___ 3___
SK18 Record events in sequence 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
	SK19 Record observations according to a system for a specific problem 1___ 2___ 3___	1___ 2___ 3___
SK20 Gather data on a particular topic and report on it 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___

STUDENT ______________________________

SCIENCE PROCESS
SKILLS OBJECTIVES

MEASURING SKILLS

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
SK21 Order concrete objects by weight, length, height, hue, texture, taste, etc. 1___ 2___ 3___		
SK22 Use nonstandard units of measurement 1___ 2___ 3___		
	SK23 Use standard units of metric measurement: length, weight, temperature, area, volume, force, speed 1___ 2___ 3___	1___ 2___ 3___
SK24 Can estimate a particular property 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
	SK25 Use formulas in measuring 1___ 2___ 3___	1___ 2___ 3___
SK26 Use tools to make precise measurements		
Simple balances 1___ 2___ 3___	Balances with metric weights 1___ 2___ 3___	1___ 2___ 3___
Measuring tape 1___ 2___ 3___	Spring scales 1___ 2___ 3___	1___ 2___ 3___
Thermometers inside, outside body 1___ 2___ 3___	Celcius thermometers 1___ 2___ 3___	1___ 2___ 3___
Measuring spoons 1___ 2___ 3___	Farenheit thermometers 1___ 2___ 3___	1___ 2___ 3___
Hand lens 1___ 2___ 3___	Liquid metric containers 1___ 2___ 3___	1___ 2___ 3___
Ruler 1___ 2___ 3___	Microscope 1___ 2___ 3___	1___ 2___ 3___
Clock 1___ 2___ 3___	Metric ruler 1___ 2___ 3___	1___ 2___ 3___
Stopwatch 1___ 2___ 3___	Weather vane 1___ 2___ 3___	1___ 2___ 3___
Compass 1___ 2___ 3___	Anemometer 1___ 2___ 3___	1___ 2___ 3___
Other ___________ 1___ 2___ 3___	Rain gauge 1___ 2___ 3___	1___ 2___ 3___
Other ___________ 1___ 2___ 3___	Barometer 1___ 2___ 3___	1___ 2___ 3___
Other ___________ 1___ 2___ 3___	Other ___________ 1___ 2___ 3___	Other ___________ 1___ 2___ 3___

STUDENT ______________________________ SCIENCE PROCESS SKILLS OBJECTIVE

INFERRING SKILLS

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
SK27 Make inferences about everyday experiences 1___ 2___ 2___	1___ 2___ 3___	1___ 2___ 3___
	SK28 State several possible inferences from a group of related observations 1___ 2___ 3___	1___ 2___ 3___
	SK29 Made additional observations to test an inference 1___ 2___ 3___	1___ 2___ 3___
	SK30 Change inferences after additional observations do not support the original inference 1___ 2___ 3___	1___ 2___ 3___

PREDICTING SKILLS

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
SK31 Make predictions based on everyday observations and occurrences 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
	SK32 Differentiate between guessing (little or no evidence) and predicting (based on evidence from observation) 1___ 2___ 3___	1___ 2___ 3___
SK33 Make predictions based on recorded data 1___ 2___ 3___	1___ 2___ 3___	1___ 2___ 3___
	SK34 Use data from graphs to make predictions 1___ 2___ 3___	1___ 2___ 3___
	SK35 Use quantitative measurements to make predictions more accurate 1___ 2___ 3___	1___ 2___ 3___

STUDENT ______________________________

SCIENCE PROCESS
SKILLS OBJECTIVES

EXPERIMENTING SKILLS

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
SK36 Perform simple short-term activities to answer some questions 1___ 2___ 3___	1___ 2___ 3___	
SK37 Conduct simple experiments and record pertinent observations 1___ 2___ 3___	1___ 2___ 3___	
	SK38 Identify constants and variables in an experiment 1___ 2___ 3___	1___ 2___ 3___
	SK39 Make observations and analyze data to arrive at a conclusion 1___ 2___ 3___	1___ 2___ 3___
	SK40 Conduct controlled experiments to test a hypothesis or answer a question 1___ 2___ 3___	1___ 2___ 3___
		SK41 Design experiments with controls and variables to test questions 1___ 2___ 3___

FORMULATING AND TESTING HYPOTHESES

PRIMARY	INTERMEDIATE	MIDDLE SCHOOL
	SK42 Develop questions concerning observations, inferences, and predictions 1___ 2___ 3___	1___ 2___ 3___
	SK43 Develop a hypothesis to explain an event 1___ 2___ 3___	1___ 2___ 3___
	SK44 Test the hypothesis through experimentation 1___ 2___ 3___	1___ 2___ 3___
	SK45 State whether the hypothesis is proven or disproven 1___ 2___ 3___	1___ 2___ 3___

APPENDIX E. TEACHING SPECIAL TOPICS

Some groups of objectives can be taught separately as special topics. These include the objectives for sex education; health, safety, and nutrition; and sound and hearing. The following lists of objectives may be used to teach these three specialized topics as complete units or courses of study.

Health, Safety, and Nutrition Course

HSN01	Good Health Practices	HSN02	Good Safety Practices
HSN03	Taking Medicine	HSN04	Four Basic Food Groups
HSN05	Essential Elements of Growth	HSN06	Dangerous Situations
HSN07	Basic First Aid	HSN08	Drugs
HSN09	Diseases and Their Treatments	HSN10	Nutrition
HSN11	Diseases and Their Prevention	HSN12	Substance Abuse
HSN13	Careers in Health, Safety, and Nutrition		

Sex Education Course

HGR01	Human Needs	HGR02	Body Parts
HGR03	Male and Female	HGR08	Stages of Development
HGR09	Reproduction	HGR16	The Reproductive System
HGR17	Pregnancy	HGR18	Heredity

Sound and Hearing Course

S01	Sounds Around Us	S02	Causes of Deafness
S03	Use and Care of Hearing Aids	S04	Properties of Sound
S05	The Ear	S06	Measuring Hearing Loss
S07	Being Hearing Impaired	S08	Investigating Sound Energy
S09	Deafness and Communication	S10	New Ways to Help the Hearing Impaired
S11	Careers in Education of Deaf Students and Other Related Areas		

APPENDIX F. OBSERVATION RECORDS

The forms in this section may be reproduced for students to use in writing accounts of experiments and observations they participate in during their science classes. Observation form A is designed for younger students; Form B for older or more advanced students.

OBSERVATION FORM A

Student's Name ______________________ Date ______________

DIRECTIONS: Observe an object or organism.

Name the object or organism ______________________

Write a description of it.

____

____

____

____

Draw a picture of it.

OBSERVATION FORM B

Student's Name ______________________________ Date ______________

Title of the Experiment: ______________________________

Problem: What do you want to find out? ______________________________

____

Materials: What things do you need? ______________________________

____

____

Procedure: How will you do the experiment? ______________________________

____

____

____

Results: What happened? ______________________________

____

____

Conclusion: Why did it happen? ______________________________

____

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APPENDIX G. SAFETY GUIDELINES FOR SCIENCE CLASSROOMS

1. Inspect all materials and equipment regularly for defects or potential hazards.
2. Store hazardous materials and chemicals in a locked storage cabinet.
3. Observe appropriate safeguards in the use of science materials and equipment: wear goggles to protect the eyes, wash hands thoroughly, etc.
4. Demonstrate proper use of heat sources, and take appropriate precautions with their use.
5. Warn students not to taste or touch things in the science classroom without permission.
6. Warn students to avoid touching their eyes or mouths while working with plant, animal, or chemical materials.
7. Have emergency equipment available (first aid kit, fire extinguishers, eye washing apparatus, clear water, etc.). Instruct students in emergency procedures.
8. Make sure science activities are adequately supervised at all times.

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